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ECONOMIC PROBLEMS OF CALIFORNIA AGRICULTURE

A Report to the Governor of California

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November 17, 1930.

His Excellency
Hon. C. C. Young,
Governor of the State of California
Sacramento, California.

Dear Sir: Herewith I have the honor to transmit a report on the "Economic Problems of California Agriculture" which has been prepared in accordance with chapter 859, Statutes of 1929, approved June 19, 1929.

In the preparation of this report, all information available from studies by the University bearing on the economic status and condition of the agricultural producers of the state has been used, and, since California agriculture is affected by conditions in other parts of this country and in foreign countries, similar information on these matters from the U. S. Department of Agriculture and other branches of the Federal government has been studied and analyzed. A special but limited investigation of the California tax system and its effect upon the farmer has been made by the College of Agriculture during the present biennium in order to obtain information needed in the preparation of the phase of the report which has to do with taxation. In addition, representatives of the University held a series of thirty hearings in different parts of the state to obtain first-hand statements from agricultural producers concerning the pressing economic problems with which they are confronted and their opinions as to possible solutions of these problems.

It has been generally recognized that in recent years economic conditions in the agricultural industry of California have been far from satisfactory. Throughout the study and the preparation of the report the aim has been to determine the major lines of action that may be taken by individual producers, by groups of producers acting together, and by state and local governments that would help to increase the returns on the capital invested in agriculture, safe-guard the interests of established farmers and make possible a better standard of living for agricultural producers in California.

The report is a product of the members of the economics staff of the College of Agriculture, and the conclusions and recommendations represent the best judgment of that group.

Yours respectfully,

Robert G. Sproul.

ECONOMIC PROBLEMS OF CALIFORNIA AGRICULTURE

BY THE AGRICULTURAL ECONOMICS STAFF

SUMMARY

The Present Situation.—Agriculture in California is today confronted with numerous problems of readjustment. General economic conditions throughout the United States and the rest of the world are such that prices for most agricultural products are low relative to the prices farmers have to pay for goods they buy and the payments they are committed to make. Consequently incomes are not sufficient to maintain or increase the standards of living and acquire independent ownership.

The unsatisfactory returns from agricultural products have been reflected in reduced real-estate values and in many cases have prevented farmers from paying their debts. The farmers' equity in mortgaged property has been greatly reduced and tax delinquencies have increased. Banks and other lending agencies have acquired thousands of farms.

The inability of many farmers to secure returns sufficient to permit them to make tax payments is preventing various bonded districts from meeting interest and principal obligations. This condition and other complications in the credit situation are curtailing credit facilities for the more fortunate districts and for financially sound farmers.

Many of the farms are so small that even though the per-unit costs are below selling prices, there is not sufficient income for the family living. These farms are often specializing in one enterprise, thus making the farmer entirely dependent on the returns from a single product. Other farms, although large enough to give sufficient returns, are not operated efficiently and costs often exceed returns.

Water costs have not decreased with prices of agricultural products. The cost and the amount of water available often prevents shifts from fruit to crops having more favorable prices but requiring more water. In some areas dependent on ground water the supply has been reduced to the point where some agricultural operations have had to cease.

The financial position of many farmers in California is such that they cannot make the shifts and changes that appear desirable. Prospect for improvements in conditions in the immediate future are not bright and there is a growing spirit of unrest and discontent among farmers.

Major Causes and Contributing Circumstances.—The fact that California is a relatively new agricultural state with vast natural resources and favorable climatic conditions made possible a very rapid develop-

ment and expansion of intensive specialized agriculture. Transportation facilities, credit conditions, laws governing the use of land and water, public opinion, and a wide-spread spirit of optimism were all favorable to rapid agricultural development. Irrigation facilities were greatly expanded between 1900 and 1920.

The unsettled conditions produced throughout the world by the War and the subsequent price changes, along with changes in consumption, made the prices of California specialty fruit and vegetable crops more favorable than prices of staple agricultural commodities. As a result farmers in California hastened to plant the higher-priced specialty crops, so that between 1920 and 1925 there was a large increase in the acreage of fruits and vegetables in the state.

The large plantings of fruit were not, of course, reflected in immediate corresponding increases in production. This fact, together with increases in demand and improvements in marketing and methods of production, resulted in satisfactory returns for some time. Expansion continued. Land owners, real estate dealers, and others interested in immediate returns promoted many development projects and the subdivision of lands into small salable units.

As long as prices remained satisfactory, few people gave serious attention to the future outlook. Thus there were no immediate natural or economic checks until the heavy plantings came into production and prices declined. However, trees and vines already planted continued to come into bearing or into heavier production, thus causing a still further lowering of prices. Furthermore, land within improved districts continued to be forced into intensive use, largely because of the high district development costs assessable against it.

As a result of the increased production of the specialty crops their prices in many cases are no longer more favorable than those of agricultural staples. Prices of the latter, however, are too low to bring satisfactory returns. The production of staple commodities throughout the world has increased, which, together with changes in demand for food and clothing and the shift from animal to mechanical power, has tended to depress their prices.

Costs of goods that farmers buy have tended to remain relatively high, and fixed charges for mortgages and bonded indebtedness have been readjusted only partially, through default and foreclosure. The system of taxing farm property has remained unchanged, while costs of government have been increasing. Thus a larger and larger part of a smaller and smaller income is required to pay taxes. With farm land values in the process of readjustment to the new scale of farm incomes, the farmer's wealth is decreasing.

Although prices for most agricultural products are at present unfavorable, there is still a tendency toward further development and expansion. California has more than enough unirrigated land within irriga-

tion projects to provide the needs for the current decade. However, another period of as great an overdevelopment as at present is hardly possible because of the increasing costs and size of new development projects and the higher costs of leveling and bringing new land into farms. Moreover, the experiences gained from the present situation and the increasing amount of knowledge disseminated will help to prevent a recurrence of similar conditions.

Complexity of California Agriculture.—The agriculture of California includes such a wide variety of products and the methods of production are organized and controlled in so many different ways that the farmers of the State do not constitute a homogeneous class or group with unified interests and similar problems.

The commercial production of many fruits and vegetables in the United States is practically confined to California. This State contributes important amounts of the interstate and foreign shipments of several field crops. The production of sheep and poultry products greatly exceeds the local demand; dairy production practically balances with local consumption; but considerable quantities of beef and pork are shipped into the state.

Farms operated by owners, part owners, and tenants, range in size from less than an acre to many thousand acres. They range in organization from those specializing in the production of a single commodity to diversified farms with many enterprises. They vary from family-operated farms averaging but a few acres to the highly developed large-scale farms employing hundreds of men and administered by salaried managers. They cover not only farms conducted solely as agricultural enterprises but also farms operated by marketing organizations as special sources of supplies. To these varied interests must be added the large landholders and speculators interested primarily in selling the land. In this latter class belong the banks, credit agencies, and other investors who have acquired farms because of default of payments or foreclosures.

RECOMMENDATIONS

The nature of the present situation and its causes make it very difficult to bring about immediate substantial improvement. Action along the lines recommended below would alleviate and improve conditions and help to prevent their recurrence.

State Activities.—Accurate information correctly interpreted is essential for guiding the activities of the State, group organizations, and individuals. The State should expand the collection, interpretation, and dissemination of information regarding market conditions and the outlook for individual crops, livestock, and livestock products. Emphasis should be placed upon providing information about the pos-

sibilities of expanding domestic markets and developing foreign outlets for California products.

The feasibility of revising the tax system deserves careful consideration. Revision could provide means for increasing revenues without increasing taxes paid by farmers. More general support of rural schools and roads, and better means for equalizing assessments of property are highly desirable.

In connection with improvement and development districts, special consideration should be given to water conservation, regulation of new projects, possible changes in the laws under which districts are formed, methods of limiting special assessments and overlapping of districts, and the possibility of more effective control over the issuance of bonds, all with a view to protecting the future welfare of farmers and investors.

The State should attempt to bring about speedy adjustments between bond holders and farmers in defaulting bonded districts. A public source of complete and reliable information as to the total outstanding bonded debt and special assessments against individual properties is greatly needed.

The State may well consider the possibilities of developing new types of credit facilities and of adapting present facilities to meet special conditions within the state more adequately.

Better regulation and supervision of the activities of real-estate dealers, finance companies, and marketing agencies may be possible. Further expansion in the use of standard grades for agricultural products would be helpful.

There are possibilities of formulating and putting into operation a comprehensive state-wide plan for better utilization of land and water resources. In the formulation of the plan, special attention should be given to determining the rate of development that will be to the best interest of the commonwealth as a whole, and special emphasis should be placed on preventing the use of marginal land for farming.

Group Activities.—By collecting and disseminating truthful statements and by regulating the activities of their members, real-estate boards, chambers of commerce, and other agencies can curtail unsound promotional schemes, help in establishing better-sized farms and render assistance in developing ways and means of taking care of excessive production of certain commodities.

More careful analysis and interpretation of the information relating to agriculture would enable banks and other landing agencies to carry on their credit operations in a way that would be more beneficial to the agricultural industry, individual farmers, and the lending agencies. In many bonded districts, attention might well be given to the possibilities of refinancing. The officers and agencies in charge of districts

now defaulting can aid by bringing about speedier adjustments of their finances.

Communities and organizations of tax payers can improve local conditions to some extent by more carefully regulating the amounts of bonds and taxes and by bringing about economies in the administration and use of tax funds.

Marketing and manufacturing agencies can aid in the collection, interpretation, and dissemination of information. The larger organizations may establish their own economic research departments. These organizations can help to increase the foreign and domestic demand for California products, help to maintain standards of quality, and in many cases assist farmers in deciding what commodities to produce.

In some cases there are opportunities for further consolidation and coordination of marketing organizations, either by federation and merger or by the formation of working agreements.

Organizations of producers and others interested in agriculture may be able to bring about the removal of the nonprofitable, marginal, or excessive acreages of some crops by effective demonstration of the relative advantages of different lines of agricultural production or by some means of compensation to farmers.

Individual Activities of Farmers.—Upon the individual farmer depends a considerable part of the improvement of agricultural conditions in California.

Many farmers can improve their returns by better and more careful selection of crops and enterprises adapted to the physical conditions of their farms, the labor available, and to the outlook for future prices. In some cases this involves diversification and the production of a variety of products, in a few cases it may mean more specialization, and in others more production for home consumption. Often an increase in the size of the farm is the most effective way of increasing returns.

Individuals will facilitate improvement by giving greater attention to the information now available for the asking and especially by keeping more and better farm and home accounts. Accounts serve to answer questions relating to the most profitable combination of enterprises, the best methods to be used in production, the desirability of changing the size of the farm, and the necessity for abandoning unprofitable enterprises and marginal farms. The value of a farmer's own accounts is increased by comparing them with those of other farmers.

The individual farmer can improve his situation by exercising care in selecting the agencies through which he will market his products and by participating in group action where it is more effective than his own individual efforts.

DEVELOPMENT OF CALIFORNIA AGRICULTURE

The geographical characteristics of California have had a dominant influence upon her agricultural development. A third of the hundred million acres of the land surface, because of its mountainous character, is suited only to the production of some kind of forest crop. Similarly because of scant rainfall, rough topography, or poor soil conditions, another third of the total area is, for the most part, unproductive of natural or cultivated vegetation. The greater portion of the remaining third is devoted to agriculture.

Much of the agricultural area, however, because of water supply, elevation, or rough topography, is utilized for grazing purposes; the area used for the production of crops occupies only 8 per cent of the total land surface, while the special crops which have become so universally associated with California's name occupy less than half of the total crop acreage.

The distribution and relative extent of the area of different adaptations which make up this small percentage is of much greater economic significance than these figures would indicate. On these lands nearly half of the nation's fruit is produced. Growing conditions have been excellent because of favorable temperatures and extensive areas of level, fertile lands lying adjacent to streams fed by the runoff from the mountains. These abundant resources have made possible the phenomenal growth of the fruit industries of the state, many of which are now experiencing economic difficulties due to overexpansion.

California's abundant agricultural productive capacity, however, has not been entirely a free gift of nature, but has been, in part, the result of patient labor and the application of hard-earned capital. The early agriculture of grazing and the production of cereal crops was much more nearly self-financed than the intensive crops which, for a period of years, have to be supported by capital originating mainly from sources other than agriculture. Agriculture under irrigation has been financed, to a large extent, by purchasers of irrigation bonds, by land-selling organizations, by irrigation companies, and by the labor and capital of present and former land owners. The conditions under which such financing could take place necessarily awaited the industrial and commercial development of the state. As this came about California emerged into her second stage of development.

Water has been and continues to be the dominant factor in California agriculture. Although irrigation in this state began more than fifty years ago, the period of rapid expansion started about 1900. Since 1900 there has been little change in the total crop acreage, but a larger proportion has been irrigated, and at present over 40 per cent of the

crop area is intensively farmed. It is this intensively farmed land which has given to California her world-wide fame for the production of fruits, vegetables, and other specialty crops, but the rate of development of this type of agriculture has produced many of the present agricultural problems of this state.

In the decade from 1900 to 1910 began one of the most phenomenal periods of agricultural expansion ever experienced by any state. More than a million acres were put under irrigation, while the grain acreage decreased a million and a half acres. The investments in irrigation works nearly trebled and large sums were expended for leveling land, constructing farm laterals, building barns and houses, purchasing livestock, planting orchards and vineyards, and many other expenditures involved in intensive irrigated agriculture. The number of small farms purchased on the installment plan greatly increased and the farm property of the state doubled in value. Production was augmented and the volume of oranges and grapes more than doubled. This rapid development of California's natural agricultural resources was greatly influenced by the changes in transportation, refrigeration, marketing, the supply of capital, and laws which made possible the financing of large irrigation projects.

California gained a temporary advantage over other areas by having an early start. Citrus production was well established as an industry before Florida, Texas and other areas attempted to produce these products on a commercial scale. But expansion in other areas is rapidly depriving California of this advantage, and hence in the future production in this State will have to compete with other areas largely on the basis of natural advantages.

The expansion of irrigation works, and the bringing of more land into intensive agriculture in smaller farms continued from 1910 to about 1925, but at a slower and slower rate. Expansion of the volume of production still continues because many orchards have not reached full bearing and much land in farms within irrigated districts continues to be more intensively farmed. The production of temperate-zone fruits, which had been unimportant prior to 1910, responded to the general optimistic trend so that thousands of acres of vines and of deciduous trees have been planted since that time. The acreage of vegetables was trebled between 1910 and 1930. The rapid shift to alfalfa has greatly increased the per-acre production of animal feed. Improvements in the livestock industries resulting in more animal products per pound of feed have been more pronounced since 1920.

Economic conditions have been largely responsible for the curtailment of expansion, although physical factors have exerted some influence. The increase in the number of reclamation projects and the energetic attempts to settle the undeveloped lands within such projects

in order to insure the solvency of these districts, combined with better methods of farming, have resulted in a greater aggregate volume of products to be marketed. Agencies and individuals responsible for the increased supply apparently expected that California could continue to expand production of specialty crops and to market the products at favorable prices. But demand has not increased as rapidly as production in California and competing areas, and prices have tended towards lower levels. The costs of bringing land into intensive use and applying water have also increased, and a condition now exists in which the income of many farmers is not sufficient to meet expenses and provide a high standard of living. Further expansion will be more difficult because of the increased size and cost of additional reclamation projects in California and the general economic conditions relating to production, demand, and prices throughout the world.

WORLD-WIDE ECONOMIC CONDITIONS AFFECTING CALIFORNIA AGRICULTURE

Economic conditions throughout the world are closely interrelated, and changes in distant parts of this country and in many foreign countries have had a marked influence on conditions in California.

The very high prices of agricultural products during the World War were caused partly by the curtailed agricultural production in Europe and partly by the general price inflation throughout the world. As a result of these high prices, production in the United States and in other countries was greatly expanded. With the deflation of money values in this and in other countries after the War, average prices of agricultural products fell along with other prices, but in most cases tended to fall lower than the average of other commodities.

Conditions in Europe after the War were far worse than in America because Europe had larger debts, unstable currency, low incomes, and much unemployment, which reduced the purchasing power of consumers. The lack of needed supplies during the War and the immediate need for revenue and employment led most countries to endeavor, especially by the use of tariffs, to be more nearly self-sufficient. The United States, in attempting to protect itself, increased duties on the goods other nations had to sell and restricted immigration to prevent their population from coming to America.

With the exception of Russia, all the countries in Europe have regained most of their pre-war agricultural production. In some lines they now produce more. Some countries that were importers of such staple commodities as wheat and sugar now produce all they consume, thus tending to reduce prices in exporting countries.

While Europe has been readjusting, other countries have maintained their war-time production, and new regions in Canada, South America,

Australia, and Africa have been undertaking pioneer development. Improvements in methods of production and the increases in the use of capital in agriculture have been rapid. Under all these conditions it is not surprising that agricultural production has tended to exceed the growth of population and that agricultural prices have tended toward lower levels. Similar disturbances in earlier decades tended to be corrected by a rapid growth of population and the accompanying increase in the demand for agricultural products. Now, however, the rate of increase of population is lessening, both in this country and in many foreign countries.

The low prices prevailing for agricultural products throughout the world have brought many requests by producers and land owners for relief. Usually these requests are for legislation to control or modify economic conditions. The most common type of attempted control has been to increase tariffs in an effort to decrease competition in the domestic market. Such tariffs may relieve conditions in the domestic market, but often aggravate them abroad by causing retaliatory tariffs to be created and by decreasing the purchasing power of foreign markets. Other governmental measures attempted have been designed to control the volume of product marketed. This has been attempted for such products as rubber, coffee, sugar, butter, wool, silk, and sisal. Control by cooperatives has also been attempted in several commodities. As a rule the various measures for relief have been only temporarily effective. The world-wide results have been to increase production and to encourage the use of substitutes.

THE NATIONAL SITUATION

Economic conditions in the United States during the last decade have been similar in many respects to those of many other countries. During the general deflation of 1920–21 prices of raw materials, to which class agricultural products mainly belong, tended to fall more rapidly and farther than prices of manufactured or semi-manufactured goods. Owing in considerable part to world conditions previously described, agricultural prices have remained throughout the decade at a lower level than manufactured goods. Changes in agriculture within the nation also have tended to prevent recovery. There has been a rapid mechanization of production. Since 1920 the number of horses and mules on farms have been reduced by 6,500,000, or 25 per cent, transferring demand for power from feed crops to oil wells. Improvements and shifts in production have increased the output per worker engaged in agriculture. There have been improvements in crop and livestock production, which have resulted in a greater output per acre or per animal. For example, practically the same number of

dairy cows as in 1920 now supply an increased per-capita consumption of a larger population.

Certain developments within the country have also had depressing influences on agricultural prices and an even more pronounced effect on agricultural incomes. Industrial laborers, aided by restricted immigration and by labor organizations striving for higher standards of living, have tended to obtain higher real wages. Along with larger incomes and the greater use of machines there has come lessened physical work and an increased knowledge of nutrition. This has brought about a smaller per-capita demand for many staple food products, but a greater demand for more varieties of food. The increased consumption of fruit, vegetables, dairy products, and vegetable oils, which either require less land per-capita than the staples or can be supplied cheaply by importation from foreign countries, has tended to depress the price of staples and land values. Since California is peculiarly suited to fruit and vegetable production it has benefited to some extent from this shift.

The changes in styles of clothing and the recognition of the beneficial effects of exposure to sunshine have tended to reduce the per-capita demand for raw materials for clothing. At the same time there has been a shift of demand from the agricultural products of wool and cotton to the forestry product of rayon. The simultaneous expansion and shift in cotton production to semi-arid regions where cotton can be produced more cheaply by large-scale methods have also tended to depress prices of raw textile materials.

The changes most pronounced during the last decade may be summarized as follows:

1. Expansion of production and curtailment of imports by restrictive tariffs in foreign countries as well as in the United States.

2. Changes in dietary habits and in quantity and nature of materials used for clothing, tending to reduce the per-capita consumption of agricultural staples and the amount of agricultural land necessary to provide for each individual.

3. Inventions and technical improvements which are resulting in the substitution of tractors for horses and mules as sources of power and the substitution of forestry products for agricultural textile materials.

4. The increase of production per acre and per animal unit through the use of more machinery and fertilizer, the improvement of varieties and strains of crops and animals, and the control of insect pests and diseases.

In view of these changes it is not surprising that there has been a reduction in the need for farm land and that since 1920 average land values have decreased throughout the United States. A further cause

for lower land values has been the increasing demands for higher standards of living among farmers and prospective farmers, who are now unwilling to use as large a proportion of their incomes to pay for land as did the farmers of a generation ago. The outlook for continued low prices of agricultural products for some years to come makes them afraid of land as a speculative investment. Many farmers are able to make satisfactory incomes under present conditions by using the latest scientific methods on land that is not overcapitalized, but the owners of high-cost land, especially if the land is heavily mortgaged or if it is operated inefficiently, are finding it impossible to make ends meet.

In so far as higher real wages in manufacturing and transportation have not been offset by technical improvements (output per worker in most industries has been increased as much or more than in agriculture), the cost of goods bought by farmers has tended to increase. Tariffs may have had some effect in supporting the prices of some nonagricultural commodities, but the changes in agriculture enumerated above have been primarily responsible for reducing the relative purchasing power of farm products.

The demand for increased governmental activity, the desire to increase standards of living by having better schools, roads, and services, and the increased cost of performing public services have resulted in higher taxes. Since farmers' gross incomes have not increased, and in some instances have decreased, higher taxes have reduced net cash incomes. In trying to maintain their standard of living many farmers have gone further into debt. Fixed mortgages and declining land values have gradually reduced and sometimes eliminated the farmers' equity in their land. All these working together have brought many farmers to a low financial state.

The results have been increases in delinquent taxes, forced sales and farm bankruptcies. Over 10 per cent of the farm population has left the farms since 1920. Many others, where conditions have been favorable, have attempted to supplement incomes by roadside stands, tourist accommodation, or temporary employment in cities or on construction enterprises. Bankers and other business people in small cities and towns have suffered from changes in agriculture. Towns in farming areas have failed to grow or have decreased in size, the people having moved to more promising locations.

Agriculture as an industry is decreasing in relative importance. New industries are being developed continually. The interdependence of agriculture and other industries is increasing. As the average per-capita income of the total population increases, a smaller and smaller proportion of that total income is used for food and clothing. Consequently agriculture as an industry tends to receive a smaller

and smaller part of the total national income. Farmers as a class have been unfortunate during the period of rapid change through which we have been passing, and have not fared as well as the average of other classes.

RECENT CHANGES IN CALIFORNIA AGRICULTURE

The farmers of California have in the past decade made many shifts in their production in an effort to meet the rapidly changing conditions with which they have been confronted. Probably the most striking change has been the great increase in the production of fruits and vegetables. Between 1921 and 1929 the percentage of the total crop acreage in the state devoted to fruits and nuts increased from 17 per cent to 25 per cent, and that devoted to truck crops from 2 per cent to 5 per cent, while the proportion of the acreage devoted to field crops declined from 81 per cent to 70 per cent.

This shift in the types of crops produced was accompanied by a larger gross farm income for the State as a whole, despite a downward trend in prices of fruits and vegetables. The total value of all crops averaged 392 million dollars in 1921 and 1922 as against an average of 482 million dollars in 1927 and 1928, an increase of 90 million dollars, or 23 per cent. During the same period the total crop acreage in the State increased only 3 per cent. The increase in gross income per acre, however, did not result in a corresponding increase in net income because of the higher costs of growing fruits and vegetables.

Chiefly because of large additions of capital for the further development of agriculture in many sections of the state, the average value per acre for all farm lands with improvements experienced a decline of only 4.4 per cent from 1920 to 1930 in this state as compared with 32 per cent for the country as a whole.

The shift from field crops to fruit and truck crops was accompanied by a decrease in the size of farms. Between 1920 and 1925 the number of farms in the state containing less than 100 acres increased from 80,800 to 102,200, while the number containing 100 acres or more decreased from 36,800 to 34,200. Since 1925, however, there has been only a small decline in the average size of farms.

FRUITS AND NUTS

Prices of fruits and nuts were not as seriously affected by the post-war depression as were the prices of most other agricultural commodities. The years 1921 and 1922 were ones of extreme difficulty for the producer of staple crops and livestock. For the fruit growers and producers of truck crops in California, however, conditions were temporarily very favorable.

Not unnaturally farmers growing the low-priced staple crops hastened to plant those fruits which were then at a higher price level

wherever necessary facilities, such as land suitable for the crop, water for its irrigation, and finance to carry the slowly-maturing orchard into bearing, were available. In general these facilities were readily available. Much land suitable to fruit production had been brought under irrigation during the previous decade. Money for planting fruit was easily obtained from banks. Bankers and farmers expected high fruit prices to continue. The responsibility for the present situation, however, can not be placed upon farmers and banks alone, but must be shared by others, including chambers of commerce and various advertising and development agencies which have sought to attract people to California.

There was, of course, considerable justification for the point of view that the way toward prosperity for most of the farmers of the State was through the planting of large acreages of high-priced fruit crops. The climate and soil of the state make it possible to produce high yields and good quality of a great variety of fruits, many of which can not be grown elsewhere within the continental United States. Furthermore, the high water costs in many irrigated sections of the state make it imperative for owners of this land to use it for crops which yield a high return per acre.

Between 1920 and 1925 the total fruit acreage in the state was increased 42 per cent, or 552,500 acres. Since 1925 there has been only a small increase in the total fruit acreage. The total acreages of certain fruits were actually smaller in 1929 than in 1925. The changes in the acreage of the various fruits are given in table 1.

TABLE 1

TOTAL ACREAGE OF SPECIFIED FRUITS IN CALIFORNIA, 1920, 1925 AND 1929

Fruit	Total acreage			Change 1920-1925		Change 1925-1929	
	1920	1925	1929	Acres	Per cent	Acres	Per cent
Almonds	55,537	99,770	97,111	+44,233	+80	—2,659	— 3
Apples	64,113	73,248	63,384	+9,135	+14	—9,864	—13
Apricots	64,047	96,443	93,103	+32,396	+51	—3,340	— 3
Cherries	13,584	15,709	18,907	+2,125	+16	+3,198	+20
Figs	24,015	58,251	58,596	+34,236	+143	+345	+ 1
Grapes	394,526	669,260	615,000	+274,734	+70	—54,260	— 8
Grapefruit	4,213	8,566	14,176	+4,353	+103	+5,610	+65
Olives	27,597	33,449	32,232	+5,852	+21	—1,217	— 4
Oranges	181,341	194,464	215,817	+13,123	+7	+21,353	+11
Peaches	118,757	165,181	154,013	+46,424	+39	—11,168	— 7
Pears	57,132	83,269	94,081	+26,137	+46	+10,812	+13
Plums	27,636	39,609	37,821	+11,973	+43	—1,788	— 5
Prunes	167,732	191,486	190,864	+23,754	+14	—622	— 0.3
Walnuts	80,004	106,329	127,485	+26,325	+33	+21,156	+20

In addition to the fruits listed in table 1 there were substantial increases in the acreage of avocados, pomegranates, dates, and persimmons. Lemons were the only fruit that experienced a decrease between 1920 and 1925 and that decrease amounted to only 2300 acres, or 5 per cent.

As the heavy plantings of fruit came into bearing, production was materially increased. Interstate shipments increased from an average of 48,160 cars in the years 1921 and 1922 to an average of 89,350 cars in the years 1927 and 1928, an increase of 86 per cent; the dried fruit output from 356,400 tons to 580,150, an increase of 63 per cent; and the canned pack from 11,815,000 cases to 18,301,000, an increase of 55 per cent.

During the same period, production of deciduous fruits in other states of the Union was also increased, although the rate of increase was not nearly so rapid as in California. The total carlot shipments of apples, cherries, peaches, pears, and plums from states other than California increased from an average of 136,780 cars in 1921 and 1922 to an average of 153,790 cars in 1927 and 1928, or 12 per cent.

Imports of fruit into the United States during recent years have constituted from 10 to 15 per cent of the national consumption. A considerable proportion of these imports, however, consist of bananas and pineapples, which are not grown commercially in this country. Nevertheless they compete with domestic fruit to some extent. During the past decade imports of bananas have increased approximately 50 per cent, and of Hawaiian canned pineapples nearly 80 per cent. Indications point to a still further increase of both during the coming years.

The increasing production of deciduous fruits was accompanied by expanding markets both in this country and abroad. The value of United States exports of dried fruits increased from an average of $20,268,000 in 1921 and 1922 to an average of $38,562,000 in 1928 and 1929; of canned fruits from $12,429,000 to $21,830,000; and of fresh deciduous fruits from $20,174,000 to $41,121,000. Practically all of the United States exports of dried and canned fruits originate in California, but only a small part of the fresh fruit exports are from this state.

California exports of fruits do not, of course, escape competition from those produced in foreign countries. Raisins and prunes in particular have met keen competition in the chief foreign markets. Foreign production of raisins has increased substantially since the War. On the other hand, there has been a decline in foreign prune production during the past four years. There is, however, no indication that the downward trend will continue during the next few years.

The increase in the consumption of California fruits was in part the result of increased demand and in part the result of lower prices.

Consumers were undoubtedly able and willing to buy a larger volume of fruits in the past two or three years than they were in the years immediately following the War. They have not, however, been willing to buy the large amounts brought upon the market at prices as high as those which prevailed a few years earlier. And the lower prices paid by consumers have resulted in lower prices to growers.

Between 1921–1922 and 1927–1928 the farm prices of fruits declined—apples 40 per cent, apricots 10 per cent, figs 66 per cent, grapes 61 per cent, peaches 45 per cent, pears 18 per cent, plums 22 per cent, and prunes 37 per cent. Of all the deciduous fruits, cherries alone escaped the downward trend in prices. In 1921 and 1922 the farm price of these nine fruits on a fresh basis averaged $51 a ton, in 1927 and 1928 only $27 a ton.

Production of grapes as a whole in California has for the present probably reached a maximum, even though there may be a further increase in juice varieties. On the other hand, the peak of production of most of the important deciduous tree fruits in California has not yet been reached. Even if no more trees are planted, the proportion of the acreage that is nonbearing and in partial bearing is sufficient to cause a further upward trend in production. In 1929, 13 per cent of the deciduous tree fruit acreage in the state was not in bearing, while an additional 19 per cent was not yet in full bearing. The prospective increase in production from these young trees during the next few years is not likely to be offset by a corresponding decline in production from old trees, since many fruit trees are long-lived. No material decrease in production will take place in the years just ahead unless many producing orchards are removed or neglected by their owners. Few orchardists will be willing to sacrifice the large investment incurred in establishing an orchard and bringing it to maturity as long as there is any prospect whatever of obtaining some income from it. Under an extended period of low prices for fruits there would be neglect of orchards, tending to reduce yields, and a gradual removal of unprofitable acreage, especially where other uses for the land seemed more advantageous.

As contrasted with most of the deciduous fruits, California citrus fruits and nuts have maintained a relatively favorable position. Between 1921–1923 and 1927–1929 f.o.b. prices of oranges increased 17 per cent, grapefruit 27 per cent, and lemons 5 per cent. The average price of almonds was 15 per cent higher in 1927–1928 than in 1921–1922, while the price of walnuts averaged the same in both periods.

Carlot shipments of oranges and grapefruit from California increased from an average of 40,270 cars in 1921 and 1922 to an average of 60,130 cars in 1928 and 1929. Fortunately most of this increase in

shipments was Valencia oranges, which are marketed during the period June to October, a time when oranges and grapefruit from other states are not available. A continued increase in the production of Valencias is in prospect. In 1929 about 20 per cent of the acreage was nonbearing. On the other hand, the peak of production from the present groves of navel oranges in California has probably been reached. Florida, Texas, and Arizona, however, which market their citrus crops between September and June, are capable of producing materially larger crops of both oranges and grapefruit than they have yet produced. It may be expected that California growers of navel oranges and winter grapefruit will experience keener competition during the coming years.

Although the production of lemons in California during recent years has frequently exceeded the demand, the California Fruit Growers Exchange has prevented prices from dropping to disastrously low levels through limitation of shipments. Plantings of lemons during recent years have been very small and it is probable that production is now at about the peak. However, heavy crops may be expected to continue for a number of years whenever weather conditions are favorable to high yields. Shipments of lemons from this state have increased from 9330 cars in 1921 and 1922 to 13,580 cars in 1928 and 1929. This increase in shipments was in part offset by a decrease in imports, but it is not likely that there will be a further substantial decrease in imports, since they are now at a low level.

While the production of almonds and walnuts has increased substantially during the past decade, there has been a downward trend in imports. Production of almonds from trees now planted in California is near the peak. Only 6 per cent of the acreage is nonbearing. On the other hand, about 31 per cent of the acreage of walnuts is nonbearing. The prospective increase in the production of walnuts will probably be more than sufficient to supply the domestic demand for unshelled nuts at the present level of prices even if none are imported. The disposal of a materially larger production than at present will probably result in lower prices on unshelled nuts unless a larger proportion of the crop is shelled.

Viewing the fruit situation in California as a whole, the most unfavorable factors are (1) the probability of excessive production of many of the fruits whenever weather conditions are favorable to high yields and (2) the heavy financial sacrifice involved in any rapid readjustment of acreage.

For those fruits grown mainly in this state, disastrously low prices in years of abnormally large crops can be prevented to some extent by limiting the supplies sent to market as has been done by the lemon growers for a number of years and by the clingstone-peach and grape

growers in 1930. This, however, is a sedative and not a remedy for excessive supplies. The real cure consists of adjusting acreage and production to demand.

From the long-time point of view a very favorable factor is the upward trend in the demand for fruits and vegetables. Although it is not likely that the increase in demand will be sufficiently rapid to relieve the present period of depression materially, there is considerable evidence that the demand ten years from now will be great enough so that even larger crops of most fruits and vegetables than have yet been produced may be marketed advantageously. However, other sections of America and other countries may be expected to increase their acreage. California cannot expect to supply all of the increased demand. The chief factors responsible for a continued growth of such demand have been operating in the past, although not as rapidly as supplies have been increased. The growth of population in the United States as a whole, which is likely to continue for several decades, is the chief factor in producing a larger market. The urbanization of the population has the added effect of reducing the proportion supplied from home gardens. The wide-spread diffusion of knowledge regarding the necessity of vitamins and certain mineral salts from fruits and vegetables as a part of balanced human diet has tended to increase consumption and create a demand for fresh fruits and vegetables at all seasons. The development of good roads and increased use of motor trucks have made possible a wider distribution of perishable products from main urban marketing centers to surrounding towns and cities.

California fruit and vegetable growers have a natural advantage because (1) California can market some products during seasons when they can not be produced in quantity elsewhere in America; (2) the soil and climatic conditions permit of effective competition with other areas on the basis of quality during other seasons. The growth of large urban centers within the state has also provided a greater local market. Foreign markets have been expanding and perhaps can be increased appreciably for fruits, especially canned fruits. However, the bulk of production must depend upon the domestic market.

TRUCK CROPS

California farmers have increased their production of truck crops in the past decade even more rapidly than that of fruits. Between 1921–1922 and 1928–1929 the acreage of truck crops in the state increased from 166,670 acres to 372,145 acres, or 123 per cent; carlot shipments from 46,376 cars to 108,383 cars, an increase of 134 per cent; and the canned pack from 4,765,000 cases to 11,868,000 cases, an increase of 149 per cent.

The increases in carlot shipments of the more important truck crops from California between 1921–1922 and 1928–1929 are given in table 2.

TABLE 2

CARLOT SHIPMENTS OF SPECIFIED TRUCK CROPS, TWO-YEAR AVERAGES, 1921-1922 AND 1928-1929

Crop	Carlot shipments		Increase from 1921-1922 to 1928-1929	
	Average 1921-1922	Average 1928-1929	Cars	Per cent
Artichokes	352	1,089	737	209
Asparagus	333	1,515	1,182	355
Beans (green)	40	102	62	155
Cantaloupes	14,235	26,066	11,831	83
Cauliflower	3,147	7,269	4,122	131
Celery	3,467	9,426	5,959	172
Lettuce	9,797	34,560	44,357	453
Onions	3,555	4,303	748	21
Peppers	39	88	49	126
Spinach	177	413	236	133
Tomatoes	2,083	4,331	2,248	108
Watermelons	4,038	5,976	1,938	48
Mixed vegetables	3,959	5,415	1,456	37

Of the great variety of truck crops grown in the state, only three—cabbages, cucumbers, and strawberries—experienced decreases in carlot shipments between 1921–1922 and 1928–1929, and those decreases were relatively small.

Data corresponding to those in table 2 are not available for carrots and peas. In 1925 shipments of carrots amounted to 332 cars and in 1929 to 6419 cars. During the same period shipments of peas increased from 569 to 2203 cars.

The packs of the important vegetables canned in California have also experienced substantial increases. Between 1921–1922 and 1928–1929 the canned pack of asparagus increased from 1,063,000 cases to 2,505,000 cases, an increase of 136 per cent; tomatoes from 1,141,000 cases to 2,610,000, an increase of 129 per cent; and tomato products from 997,000 cases to 2,308,000 cases, an increase of 132 per cent. On the other hand, the pack of peas decreased from an average of 280,000 cases in 1921 and 1922 to an average of 79,000 cases in 1928 and 1929, a decrease of 72 per cent.

A considerable part of the increase in production of truck crops in this state has been in areas which, because of their climate, can produce crops during those seasons of the year when home-grown or locally-grown supplies from other areas are not available. California is the dominant region in the production of fall, winter, and spring

vegetables. For example, this state furnishes most of the market supplies of table asparagus in March and April, cantaloupes in May and June, carrots in November and December, cauliflower from December to May, celery in December and January, lettuce in January, February, March, May, June, October, and November, peas from October to March, and tomatoes in October and November.

Asparagus and spinach are canned only in this state, but tomatoes and peas are canned widely throughout the country. In states other than California, the pack of canned tomatoes increased from 6,758,000 cases in 1921 and 1922 to 8,941,000 cases in 1928 and 1929, and the pack of canned peas from 10,335,000 cases to 18,503,000 cases.

Despite the increase in demand, the large expansion in fresh shipments and canned pack had a depressing effect on the prices of the majority of the important truck crops grown in the state. Between 1921–1922 and 1928–1929 farm prices of table asparagus declined 14 per cent, table beans 26 per cent, cantaloupes 37 per cent, cauliflower 48 per cent, celery 35 per cent, cucumbers 26 per cent, onions 12 per cent, canning peas 9 per cent, table spinach 22 per cent, canning spinach 20 per cent, strawberries 15 per cent, table tomatoes 56 per cent, and watermelons 31 per cent. On the other hand, prices of a few of the truck crops averaged higher in 1928–1929 than in 1921–1922: Prices of canning asparagus increased 4 per cent, and of canning beans 38 per cent. Considering the industry as a whole, however, the tendency has been toward lower prices. The gross farm income per acre for all truck crops in California averaged $245 in 1921 and 1922 as against $204 in 1928 and 1929, a decrease of 17 per cent.

One distinct advantage of the truck-crop industry as compared with the fruit industry is that the acreage of particular truck crops can be more readily adjusted to the market outlook. With the exception of asparagus they are annual crops, and consequently the acreage can be reduced after a season of overproduction and increased after a season of underproduction. Thus a period of either over or underproduction extending for several years can be avoided. On the other hand, there is the constant danger of annual over response; that is, the production of a larger volume of the various truck crops after a season of high prices than can be marketed at an advantage. This danger can be largely avoided, however, if growers will adjust their planting on the basis of the probable market outlook at the time the crop will be ready for harvest rather than upon the prices received the past season.

FIELD CROPS

Although the climate of California offers natural advantages for the production of certain fruits, nuts, and vegetables, there are numerous other areas as well adapted as California to the production of

staple crops. Year-to-year changes in prices received for California agricultural staples are, therefore, almost entirely determined by the national or world situation. The relative advantage of different crops changes with changes in market demand, methods of transportation, growth and location of population, increase in capital, and the development of competing areas.

The early advantage or necessity for many farmers in California to produce staple crops, such as barley and mixed hay, was rapidly disappearing before the beginning of the present decade. The relatively low prices of grains and other field crops during the post-war depression hastened the curtailment of this production. The harvested acreage of twelve of the principal field crops decreased from an average of 5,478,000 acres in 1919 and 1920 to 4,393,000 acres in 1925, a contraction of 1,085,000 acres or 20 per cent. The greater relative profitableness of fruits and vegetables, as previously explained, was partly responsible for shifts in production. Between 1925 and 1929–1930 conditions changed. Due partly to the overexpansion in fruits and vegetables, the acreage of the twelve principal field crops ceased to contract, showing a net increase of 291,000 acres. However, the acreage in field crops 1929–1930 was only 85 per cent of that in 1919–1920.

The changes in acreage for the individual crops during the decade are given in table 3.

Principal Grains.—Among the grains, barley occupies the largest acreage. Practically one-third of the production is exported. During the last five years exports have averaged 260,000 tons annually, of which 85 per cent was shipped to Great Britain. California barley constitutes nearly 30 per cent of the total supply available in England and usually commands a premium in price for its superior malting quality. Prices of malting barley in California are almost entirely dependent upon and tend to fluctuate with prices of malting barley in Great Britain. Farmers in California therefore can not materially influence the general level of barley prices by controlling supply. They can, however, maintain or improve malting qualities of barley and in that way gain a price differential over competing areas, as well as a market for a greater volume than would otherwise be the case.

The downward trend in barley acreage reflects to some extent the growing importance of other crops in California, but it also reflects the changes in foreign demand for brewing barley. A special study of foreign conditions would be helpful in determining the future demand for brewing barley.

Wheat production in California is now fluctuating around 12,000,000 bushels a year, which is less than half the wheat requirements of the state. During the four-year period, 1926–1929, California imported

TABLE 3

HARVESTED ACREAGE OF SPECIFIED FIELD CROPS IN CALIFORNIA, AVERAGE 1919 AND 1920, 1925, AND AVERAGE 1929 AND 1930

Crop	Acreage			Increase or decrease 1919-1920 to 1925	Increase or decrease 1925 to 1929-1930
	Average 1919-1920	1925	Average 1929-1930		
	In thousands of acres				
Principal grains—					
Barley	1,119	1,050	1,002	—69	—48
Wheat	901	603	697	—298	+94
Rice	159	103	103	—56	0
Crops other than grain—					
Beans	386	240	349	—146	+109
Cotton	118	172	291	+54	+119
Sugar beets	115	76	59	—39	—17
Potatoes (white)	68	43	35	—25	—8
Potatoes (sweet)	8	9	11	+1	+2
Feed and forage crops—					
Hay (tame)	2,150	1,777	1,783	—373	+6
Oats	151	151	153	0	+2
Grain sorghum	159	88	119	—71	+31
Corn	144	81	82	—63	+1
Total	5,478	4,393	4,684	—1,085	+291

annually an average of 16.2 million bushels of wheat in the form of grain and flour, 50 per cent of this wheat coming from Washington and Oregon. The states of Idaho, Utah, and Montana, but particularly Idaho, furnished 37 per cent and are gaining in importance. The remaining 13 per cent came from other states.

This situation tends to give wheat farmers of California an advantage in price equal to the freight from other areas in the United States to California. The world price of wheat is established at London and Liverpool because Great Britain imports duty-free wheat from many parts of the world. The price of wheat at Portland is very closely related to the world wheat price because the United States Pacific Northwest ships annually approximately 26 million bushels of wheat to Europe. The price of wheat at San Francisco in turn moves in close sympathy with the price of wheat at Portland because the price of wheat at San Francisco tends to be equal to the price of wheat at Portland plus the amount of the expense incurred in bringing wheat from Portland to San Francisco.

The trend of world wheat production during the next few years will, no doubt, be determined principally by the trend of production

in Canada, Argentina, and Russia. During the past twenty years production in Canada has increased by an average of 15.0 million bushels annually. In Argentina it has increased 5.5 million bushels a year. The extension of wheat acreage in Canada and Argentina appears to be comparable to the westward expansion of wheat acreage in the United States before 1910. Current reports indicate that if present efforts of the Russian Soviet Government in connection with wheat production prove successful, Russia will be a source of large export supplies. Present low prices will very likely decrease acreage in some wheat-producing sections.

Rice production in California is limited to areas where irrigation water is plentiful and comparatively cheap. California produces 20 per cent of the United States rice crop on 14 per cent of the United States acreage. Japanese round rice, grown principally in California, yields more per acre than does Blue Rose rice, the principal variety grown in the southern states. The harvested acreage of rice in California, as well as that of the southern states, fluctuates widely over a period of years, but although the acreage has been successively smaller during the past three years, there is no evidence that the long-time trend is downward.

The price of Japanese rice at San Francisco moves with the price of Blue Rose at New Orleans, which is very sensitive to changes in the total United States rice production. However, since this country tends to have a net export surplus of rice, prices tend to be established by world-wide conditions. The 1921–1929 average price of Japanese cleaned rice at San Francisco was $5.05 a hundred. The highest prices occurred during the crop year of 1925 (beginning August 1), the average price being $7.00 a hundred. In 1928 and 1929 the prices averaged $3.70 and $4.15, respectively. Since 1928 there is considerable evidence that long-grained rice is displacing California round rice, forcing it to a discount as compared with former years.

Crops Other Than Grain.—Bean production in California constitutes such an important part of the total United States bean production that for most varieties prices received are to a large extent determined by production in this state. Adjustment of production to probable demand in therefore largely within the power of California farmers.

In the production of dry edible beans, California ranks second, producing 27 per cent of the total produced in the United States; Michigan produces 36 per cent. California produces practically all of the commercial supply of Limas and Baby Limas, Pinks, Blackeyes, Cranberries, and Bayos. A study of bean prices shows that each type of beans has in a large measure its own market. California pink beans do, however, meet with competition from Pinto beans produced mainly in Colorado.

California bean acreage experienced a contraction of 146,000 acres between 1919–1920 and 1925. The reduction was most pronounced in Large Whites, and Small Whites, and Bayos. Since 1925 the total bean acreage of the state has increased 109,000 acres, an increase of 40 per cent. This is largely accounted for by the increase in Baby Limas. The United States bean acreage has increased 25 per cent since 1925 and is now 200,000 acres greater than the previous high point of 1,800,000 acres in 1917.

Cotton production in California has within ten years expanded from a minor field crop to a position among the major field crops. Since 1919–1920, acreage has increased from 118,000 to 291,000, an increase of 150 per cent. During the same period, production increased, because of higher yields per acre as well as larger acreage, from 27 million pounds to 115 million pounds, an increase of over 400 per cent. The higher average yield is due to the fact that the expansion took place in the southern portion of the San Joaquin Valley, where yields are much higher than in the Imperial Valley, in which most of the acreage was formerly located. California, with her present production, contributes less than 2 per cent to the total United States cotton crop, which for the three seasons 1928–1930 has averaged 14,500,000 bales. However, California produces mainly long-staple cotton and although total production in the United States is one of the chief factors influencing cotton prices, the quality of California cotton commands a premium. During the three crop seasons, 1927–1929, the California farm price of cotton has been slightly above the average wholesale price of 18 cents a pound for middling cotton at New Orleans.

Sugar-beet production in California has declined steadily since 1920, the acreage being reduced one-half. The relatively low price of sugar is due primarily to an increased world supply augmented by restrictive tariffs and bounties in many countries that are trying to produce their own supply. California produces only about 8 per cent of the continental United States sugar-beet crop, which in turn supplies only a fraction of the total sugar consumed in this country. As long as the United States constitutes the chief market for Cuban sugar and as long as California beet sugar has to compete directly with duty-free sugar from the Hawaiian and Philippine Islands, the relative advantage of producing sugar beets in California will be such that production will tend to be curtailed as soon as other uses for the beet land become more profitable.

Production of white potatoes in California, except for early potatoes, is at a disadvantage as compared with Idaho, where production of high-quality potatoes has been expanding. Competition from this region is largely responsible for the decrease in acreage in California.

Sweet potato acreage has increased about 22 per cent since 1925, owing to the increased local market, the increased shipments to the Pacific Northwest, and to the fact that the California soil and climate are well suited to the production of this crop.

Vegetable seed production in California is also of commercial importance. Practically all of the United States production of bean (pole), carrot, cauliflower, celery, lettuce, onion, parsnip, and parsley seed is grown in California. Sections other than California are dominant in the production of beet, cabbage, cucumber, melon, pea, spinach, and tomato seed. The cost of seed is a minor factor in determining the acreage of vegetables to be planted and consequently the price must fall very low before appreciable additional supplies will be taken off the market. When supplies are greater than seeding requirements they must either be used for feed, carried over, or wasted. Therefore the adjustment of California vegetable seed production to planting requirements becomes of prime importance for those seeds in which this State is dominant.

Feed and Forage Crops.—The production of feed crops depends to a large extent on the local or State demand for animal feeds. Although the crops are often produced and sold for cash, they are usually bought by other farmers within the State. As long as California tends to be a deficit area in the production of feeds, the producers tend to have the advantage of freight differentials.

Tame hay occupies the largest acreage of all field crops, but the acreage has been declining steadily from 2,700,000 in 1914 to 1,783,000 in 1929–1930. This decline in acreage has not resulted in decreased tonnage. Production has been increased by the shift to alfalfa, which yields more per acre than do grain and mixed hay. Alfalfa now occupies more than half of the total tame hay acreage. This change has accompanied the decrease in the number of horses and the increase in the dairy industry.

Corn acreage decreased from 144,000 in 1919–1929 to 82,000 acres in 1929–1930. Since corn is used largely as a roughage for cattle, it has tended to be replaced largely by alfalfa. In the Sacramento–San Joaquin Delta section, a considerable portion of the corn is matured for grain. The price of shelled corn, like that of oats and grain sorghum, is determined largely by the demands for feed within the State and the prices elsewhere plus transportation costs.

The live stock and feed crop situation are closely interrelated, both within the state and throughout the country. The changes in the production of live stock are in some cases the effects of, in other cases the cause for, the changes in feed crops. Unbalanced production of feeds relative to live stock products may be advantageous or disadvan-

tageous to live stock producers. Abundant cheap feeds and scarce high-priced animal products mean large incomes for live stock producers, while high-priced feeds and low prices for animal products may result in losses. At the present time, however, both feeds and animal products tend to be relatively cheap.

LIVE STOCK

California produces more poultry and sheep products than are consumed within the state, while other major live stock products are imported in considerable quantity. Production of live stock and live stock products in California represents only a small part of the total production in the United States, and therefore variations in production within the state have only small effects on prices.

As contrasted with the rapid increase in the production of fruits and vegetables, there has been only a moderate increase in the numbers of live stock. Expansion in numbers of sheep, poultry, and dairy cattle has been offset to some extent by a decline in the number of horses, hogs, and beef cattle.

The substitution of mechanical power for horses and mules has gone forward more rapidly in California than in the country as a whole. The state's total in 1929 was less than 60 per cent of the number in 1909. The ratio of colts to horses has continued downward, indicating a further decline for the immediate future. The decrease in the feed required for such animals has gone far in furnishing the feed needed for increased numbers of other classes of live stock mentioned above. Reducing all of the feed consumed by live stock to one common denominator—digestible nutrients—it is estimated that feed requirements for all of the state's live stock at present are only 10 to 15 per cent greater than they were a decade ago.

Dairy.—Accompanying the growth of the cities and the increase in population, there has been a steadily increasing proportion of the milk produced in the state that is consumed as whole milk, cream, and ice cream. The increase has been especially marked in the past decade. In 1929 more than twice as much milk was consumed in the form of whole milk, cream, or ice cream, as was consumed in these forms in 1920. In 1920, 64 per cent of all the milk produced in California was used in the manufacture of butter and cheese, while in 1929 only 41 per cent was so utilized. In recent years considerable quantities of butter and cheese have been shipped into the state from other areas.

A continuance of the growth of population in the state and the increasing importance of milk in the diet will create a demand for larger quantities of whole milk and cream at higher prices than can be obtained for milk to be used for manufacture.

However, the price of market milk and cream in California as elsewhere is closely related to the price of butter. Until the latter part of 1929, the price of butter had been relatively favorable, compared with the prices of many of the agricultural products of the State. For the five years 1925–1929, the purchasing power of butter was above the pre-war level. Accompanying the general decline in prices in the latter part of 1929 and early in 1930, the price of butter declined sharply. This has been reflected in declines in the prices received by California dairymen who sell their products for utilization as whole milk and cream. The same situation has prevailed for those whose product is used in concentrated milk and cheese production. Owing to the comparative ease of reducing numbers of cows milked, the dairy industry has in the past succeeded in adjusting milk production rather readily. The present very low price of dairy products is temporary. The trend of prices for all forms of dairy products in California in the years ahead will depend largely on the trend of butter prices throughout the country, and to some extent on world prices. So long as the United States has practically no export trade in butter and so long as the present tariff remains in effect, it is to be expected that the total production of butter in the United States will continue to be the most important factor influencing butter prices.

Poultry.—The number of chickens in California increased from about ten million in 1920 to an estimated eighteen million in 1930, and the production of eggs was more than doubled in this period. Large quantities of eggs are now shipped to eastern markets at all times of the year. Hence returns to California producers are now governed largely by the competition they meet in eastern markets from eggs produced in other parts of the country. Although the production of eggs in the parts of the country where the poultry flock is usually a side line on a general farm remains fairly constant from year to year, there seem to be cycles of alternating increasing and decreasing production in areas where egg production is a specialized business. These cycles are usually from three to five years in length, and corresponding to these are changes from low prices to high prices and back to low prices again throughout the country. Marked changes in the volume of egg production can be made in a short time, because the number of hens can be increased rapidly, and because only a comparatively small amount of capital is required to enter the industry.

Throughout 1930 the industry has been in the trough of a depression. As a result, it is to be expected that many producers will either be forced out of business or will curtail their production so that a year or two hence prices will again rise.

The fact that California poultrymen can market high-quality eggs at the season of the year when the nation's total production of eggs is

lowest has been one of the outstanding reasons for the increase in production which has occurred in California in the past decade. Since the climate of parts of the state is especially favorable for fall and winter egg production, poultrymen have been able to overcome the handicap of the great distance from eastern markets. However, increasing numbers of poultrymen situated where the climate is less favorable are learning how to handle their flocks so as to produce high-quality eggs in the season when the supply is low and the price high. California producers must expect continued competition from other areas.

When compared with pre-war price levels, prices for poultry in all parts of the country have been relatively higher than prices of eggs for the last ten years. This is probably due to an increase of the light-weight breeds, especially Leghorns, such as are common in California and a greater concentration of effort in egg production. The California poultryman has been and will continue to be primarily interested in egg production. The demand for meat from Leghorns has not followed that for chickens in general in the country, and poultrymen in this State have in the past been confronted with the serious problem of disposing of this by-product of the egg industry. Numerous improvements in grading and canning poultry have served to relieve the situation in which California egg producers found themselves.

Turkey prices in both the state and nation, like general chicken prices, have been rather favorable. The production of ducks, squabs, and other classes of poultry is generally highly specialized for markets of rather limited and uncertain demand.

Sheep.—Lamb prices were on the upgrade from 1921 through 1928. Lamb production in the United States increased continuously during the period, but consumer demand for lamb increased more rapidly. Production in California in this period increased at a more rapid rate than did production in other parts of the country. Numbers continued to increase in California as well as in the country as a whole during 1929 and 1930, but demand has declined materially, so that prices have now fallen to very low levels.

In view of the large numbers of sheep now in the country, the price situation for the next year or so does not appear to be favorable. But looking further ahead, the demand for lamb should increase with the continued urbanization of the country. The average city dweller prefers small cuts of meat. Lambs furnish cuts which fit in admirably with this scheme. The characteristic of the present-day consumption of slaughter-house meat is the preference for younger animals, lighter and leaner carcasses, and smaller cuts. This is the result, in part, of the limitations of the modern kitchen, of the preference for broiled

rather than roasted meats, and of the disfavor into which boiled meats have fallen. This trend expresses itself in the preference for lamb, baby beef, young pork, and broiler poultry.

The increase in sheep numbers has been accompanied by a corresponding increase in the domestic production of wool. In addition wool production in foreign countries has been increasing for several years. A considerable part of the wool used in this country is imported. The major portion of the imports consists of lower-quality wools not produced in the United States. Although there is a high tariff on grades of wool which are grown at home, prices have been declining for several months. It is difficult to see how prices can materially recover, until the world supply of wool decreases or world demand increases.

Compared to other sheep-producing areas of this country, California has the natural advantage of climatic conditions favorable to early lambing. California lambs can be ready for market early in the spring before young lambs from other areas can come in competition with them. More serious, however, is the competition experienced from the lamb crop of the previous year fed west of the Mississippi River.

Beef Cattle.—While cattle raising is the oldest agricultural enterprise in the state, a majority of the cattle now slaughtered in California are shipped from other western states, either for immediate slaughter or as feeders to be fattened on hay and concentrates produced in the State. Nearly all the beef cattle raised in the State are slaughtered here, so that prices to California producers are usually higher than prices to cattle producers in the other western states, where beef-cattle production is in excess of consumption. During the past decade, the number of beef cattle in the state has been practically stationary, with a decline since 1928. However, there has been a marked increase in cattle feeding in the state, accompanied by an increase in shipments of feeders into the state. With the continued increase in dairying, a larger proportion of the beef supply of the state has been furnished by dairy cattle. This trend will probably continue.

For the United States as a whole, beef cattle are in a relatively strong statistical position at the present time. During the past sixty years beef-cattle prices have passed through three distinct cycles. At the present time prices appear to be on the downgrade of the fourth cycle, the peak having been reached in 1929. The number of cattle, other than dairy cattle, in the United States on January 1, 1928 was the smallest since 1922 and second smallest since 1898. Since 1928, numbers have been increasing. In 1930 prices declined largely on account of low consumer-demand for beef. However, num-

bers of beef cattle are still comparatively low, and some recovery in prices would doubtless follow any improvement in demand.

Beef-cattle production in the country has not shown any perceptible upward trend for at least twenty years, while population has continued to increase. If these trends continue, California ranchers who raise beef cattle can expect less competition from other areas.

For many years beef-cattle raising has been largely conducted on grazing land, which in most cases is not suitable for crop production. Unless returns from raising sheep and cattle become much more favorable relative to returns from crop production, sheep and cattle raising will doubtless continue to be confined to the areas which they now occupy. Since practically all of the grazing land of the state is now being utilized, any increase in the proportion of this land used for cattle raising must be accompanied by a corresponding decrease in the proportion used for sheep production. Hence it is doubtful if any marked increase in cattle raising in the state is to be expected. On the other hand, it may be that with the continued growth of urban population in the state there will come an increase in the demand for higher-grade beef which can be produced only on suitable fattening feeds.

Swine.—California imports large amounts of cured pork products and live hogs. Prices in this state are higher than the average throughout the country, but fluctuate in the same cycles. The relation between the price of corn and the price of hogs is one of the important factors affecting hog production in most states. In California more barley than corn is used to feed hogs. Although the relation between the price of barley and the price of hogs is similar to the price relation above mentioned, the barley-hog relation seems to be subject to more violent fluctuations. The price of California barley depends largely on the foreign demand for brewing purposes, which often tends to make barley too expensive to compete with corn in the production of pork.

Swine production in the United States has depended to a considerable extent on foreign markets for cured products and lard. The foreign outlets have been contracting instead of expanding. Furthermore, the increasing competition or substitution of cheap vegetable oils for lard has tended to depress prices. There appears to be no long-time outlook for an upward trend of hog prices. However, the short-time outlook indicates relatively high prices for a year or two owing to the present shortage of corn and the fact that the cycle of hog production is approaching a low point.

Farmers, by following the data furnished by the United States Department of Agriculture as to the outlook regarding hog production and prices, can adjust their production to some advantage where

pork production is one of the main enterprises. However, where hog production tends to be only a side-line enterprise for utilizing feeds that would otherwise be wasted, it is more important that the number of hogs be adjusted to the supply of local waste feeds. Hog production in California will always be of some importance as a side-line enterprise, similar to poultry flocks in many other states, but in view of the more favorable conditions for raising hogs in the corn belt, it is doubtful if it would be profitable for the farmers of the state to increase pork production enough to meet local demands.

Minor Enterprises.—The first part of the past decade witnessed the rise of a considerable milk-goat industry, centered in the vicinity of the larger urban areas of the State. The demand for goat milk, however, has been limited and any wide expansion of the industry is doubtful. Numbers have been decreasing for several years.

Angora goats are utilized to some extent for clearing brush and logged-off lands in California. In view of the low prices prevailing for mohair and the almost undeveloped demand for the meat, however, the industry will probably continue to occupy a place of minor importance in this state.

The raising of rabbits for both meat and pelts is gaining in importance. The industry has usually been carried on as a supplementary occupation by persons in suburban areas. On account of the small initial capital requirements, the industry suffers from periodic booms. The demand for the meat is not steady, and although the demand for pelts is apparently increasing, prices are low.

California sets world standards for honey and yet on account of the close correlation between honey and sugar prices, the beekeeping industry has suffered severely. In view of the present unfavorable condition of the sugar industry, the honey outlook does not appear to be promising.

LAND UTILIZATION

Important changes in land utilization during recent decades and the bearing of these changes upon the agricultural situation in California have been discussed. Certain outstanding relations between the major uses of land and the natural resources of the state have also been presented. There remains to be considered the relation of land utilization to the volume of production, to changes in size of farms and land values, and to the possibilities for improving the situation. These possibilities include restriction, for the present, of new development of irrigation works; group action in the removal of orchards and vineyards, together with the substitution of alternative crops; and the promotion of forestry or some other major use of land in lieu of agriculture on cropped areas which are distinctly submarginal under present economic conditions.

VOLUME OF PRODUCTION

Increased production per acre made possible by shifts to intensive crops has resulted in an enormous increase in the physical volume of agricultural production without much increase in acreage. This increase in volume of production in the last twenty years has been more than 100 per cent, while the acreage in crops has increased only about 15 per cent. The groups of crops which have declined in production have been those having relatively low gross returns per acre, while each of those commodities, the production of which has been greatly increased, has a high gross return per acre. If the farm price of all products from the land in 1909 had been exactly the same as prices received in 1929, and if yields per acre had remained the same, the shift from less intensive to more intensive crops that took place between 1909 and 1929 would have increased the gross value per acre by 61 per cent.

The index numbers given in table 4 show the trend of agricultural production over the past twenty years. The index number 206 for 1928 indicates that the physical volume of California agricultural production was 106 per cent greater in 1928 than the average production during the period 1910 to 1914. That of 1929 was only 80 per cent greater, due primarily to a late frost. These increases over the pre-war period reflect the changes in land utilization which have accompanied the rapid expansion of irrigation and important changes in production practices. Attention has already been called to the reduced feed consumption brought about by declining numbers of horses and to the increased output or dairy products per pound of feed consumed. These trends have had a marked influence upon the amount of land required in proportion to the volume of production.

TABLE 4

INDEX NUMBERS OF VOLUME OF AGRICULTURAL PRODUCTION IN CALIFORNIA

1909-1929

(Base period 1910-1914 average production=100)

Year	Index numbers	Year	Index numbers
1909	75	1920	132
1910	91	1921	131
1911	100	1922	145
1912	102	1923	160
1913	89	1924	138
1914	119	1925	168
1915	123	1926	181
1916	119	1927	189
1917	143	1928	206
1918	121	1929	180
1919	142		

CHANGES IN SIZE OF FARMS AND VALUE OF FARM REAL ESTATE

An outstanding characteristic of the recent developments has been an increased investment of capital in land improvements and a decrease in the size of farms measured in acres. Small farms have higher values per acre largely because investment in buildings is nearly equal to that on large farms. Likewise, they are usually farmed more intensively and hence require more improvement per acre. The relation of values per acre to size is indicated by the average value of a number of farms by classes in the San Joaquin and Sacramento valleys for 1924 to 1928; for farms of 20, 40, 60, and 80 acres the corresponding values per acre were $377, $261, $211, and $190.

Although the index number of farm real-estate values by the United States Department of Agriculture indicates that average farm real-estate values per acre for the entire state have declined only 4 per cent during the last decade, it does not follow that the average value per acre for given-sized farms have declined by only this amount. The land from many large or medium-sized farms is more valuable per acre now than in 1920 because it has been subdivided and a great deal of capital invested. According to the census, the total acreage in farms decreased from 29,366,000 acres in 1920 to 27,517,000 in 1925, but the number of farms increased from 117,700 to 136,400. Since farms of over 100 acres decreased 2700 in numbers, the increase in farms of less than 100 acres was 21,400. However, there was only an increase of less than 900 in the number of farms with 50 to 100 acres, so that the increase of small farms of under 50 acres during the five-year period was 20,500. Each of the classes, 3 to 9 acres, 10 to 19 acres, and 20 to 49 acres had about the same absolute increase of a little over 6000 farms each. However, small farms of 3 to 9 acres each had the largest percentage increase, 44 per cent. Between 1925 and 1930 the total number of farms remained constant.

The new capital incorporated in farm real estate during the last ten years has tended to maintain the average values per acre for the entire state, but land values on many established farms have decreased rapidly. The decline of 4 per cent as shown by the index number mentioned above represents the composite results of gains in value from adding more capital and the decrease in value due to changed economic conditions. A more representative picture of changes in real-estate values of specific or established farms can be obtained from the data on sales of farms in the Sacramento and San Joaquin valleys.

The recorded selling prices of farms 20 to 80 acres in size which have been offered as security for Federal Farm loans have made possible the comparison of average land prices in the two-year period, 1929 and 1930, with the average for the two-year period, 1919 and 1920. These farms have not been taken over by the bank through

foreclosure, but represent bona fide sales from one individual to another. These records indicate for the decade a decline of 40 per cent in the selling price per acre of real estate in these two valleys.

IRRIGATION

Irrigation development, which has been so vital to California's growth and which has been the means of adding an important part to the increased value of agricultural production, is inextricably related to the entire agricultural economic situation, to population growth, in fact to the entire commercial and industrial development of the state and nation. However, there are certain economic characteristics of irrigation development which must be given consideration if it is not to impede the progress of the State in the future.

Irrigation construction promoted and financed during a period of high prices provides structures which are greatly in excess of the needs in times of low prices. Many years are required to build irrigation works, obtain settlers, level the land for irrigation, create new farms with buildings, permanent crops, fences, and equipment.

Under the present economic organization the volume of production is regulated largely by prices. In agriculture this regulation is very imperfect because of variations in climatic influences and the time necessary to make adjustments. The period of development is so great for agriculture under irrigation that forces working toward increased production continue to operate for a long time after the prices have been reduced to unprofitable levels. For fruits, three to five or more years are required for trees to come into full bearing after they are planted. This period of time, added to the length of time required to develop irrigation projects and establish farms, prolongs the period of overdevelopment. While production cycles occur in other states and for other products entirely independent of irrigation, in California the time required to bring fruit trees into bearing is a greater disturbing element when superimposed upon the other difficulties of irrigation development. When low prices prove that too many trees and vines have been set out a period of pessimism follows. In the long run, the drastic curtailment of planting may be just as detrimental as a surplus.

The modern irrigation project must be of such size that it may economically utilize water supplies which involve large expenditures for development. As a result, more land may be provided with irrigation facilities than is needed immediately upon the completion of the project. Since the costs of the project are assessed against the land, owners promote the development of their holdings in order that they may at once produce an income to meet these costs. To those unfamiliar with the difficulties involved in creating irrigated farms

and the amount of capital needed to turn dry land into irrigated crops, the large gross returns from agriculture under irrigation are an inducement to purchase land. The result is either a forced expansion of agricultural production beyond the normal demand, or loss through retarded development to those who own land within the project.

A different condition develops when the agriculture of a given community has been expanded beyond the supply of water permanently available. Such a situation exists in the four southern counties of the San Joaquin Valley, where more than 400,000 acres are irrigated by use of ground water. The water shortage has been more pronounced in recent years of low rainfall. Year by year the ground water has receded, the cost of pumping has increased, and many orchards have been abandoned. If additional water is to be supplied to this area it must be conveyed from distant sources. The agriculture of the locality is highly intensive and therefore much pressure has been brought to bear to find ways and means of supplying supplementary irrigation water. There are approximately 6,500,000 acres of unirrigated irrigable land in the two interior valleys and in the foothills. The rate at which these lands are likely to require a water supply will have an important bearing upon the design of works for the solution of the San Joaquin water shortage.

NEED FOR IRRIGATION

Although there are fundamental economic forces at work tending to retard the rates at which growth may take place, there will be need, if the State is to continue to grow, for more land under irrigation. In the past, however, irrigation facilities have been made available faster than farmers have been able to put the land under cultivation. The 6,500,000 acres of unirrigated irrigable land in the interior valleys can be made available only upon the expenditure of large sums of money. Much of the future development must be carried out at costs per acre which are much greater than have been paid in the past and which are entirely out of proportion to present per acre returns.

The rate of development of agricultural land in California that would be to the best interest of the greatest number of people can not be definitely determined from present knowledge of trends in population, acreage, production, and per-capita consumption. However, approximations can be made and the underlying principles stated in general terms. Acreage should be added in California to just that extent which will provide the needed supply of agricultural products more cheaply than could be done by increasing the investment in labor and equipment on lands already under cultivation, and also more

cheaply than the products can be produced in other states and shipped to California or to main consuming centers.

There is a large area of unirrigated irrigable land within California irrigation and reclamation projects and on farms partly irrigated by private pumping plants which is potentially available for early development. The present economic status of industry and agriculture, the increasing production per acre on land now under irrigation, and the possibilities of development within competing areas, all point toward the conclusion that development which would involve bringing substantial areas of additional land under irrigation is not needed at this time.

If economic conditions affecting California agriculture improve early in the decade, it is estimated that half a million acres can safely be added to the intensively irrigated area before 1940, but the acreage of unirrigated irrigable land within California projects is more than sufficient to take care of this expansion. During the decade beginning 1940 it is probable that three-quarters of a million acres might be safely added, but the significant trends in population and increasing costs of irrigation development indicate that in the two decades between 1950 and 1970 the optimum rate of growth will be somewhat less than this. These estimates may not hold good in every respect over the entire period to which they pertain. Therefore, new estimates should be made as additional data become available.

Irrigated farms contribute such an important part to the total agricultural production of the state that those charged with the duty of establishing the State policy with respect to irrigation development can exert some control over production cycles and the resulting price disturbances. Although in the past there has been a tendency to push irrigation development beyond the point required for supplying land as needed, irrigation expansion in the future will be retarded by the magnitude and expense of new projects. To assist in carrying out the program of the future, more knowledge will be required concerning the adaptation of crops to the land, irrigated and unirrigated. More information is needed concerning the costs of increasing the agricultural output by more intensive utilization of lands now under irrigation as compared with the costs of new major projects.

If those who have important responsibilities in formulating the future land development policy of the State will consider the important economic trends affecting production of and demand for agricultural products, another period of agricultural distress due to overexpansion may be averted. It is also necessary to visualize the completed structure now in the minds of the State builders and to look beyond the short-time cycle for the purpose of making more secure the foundation upon which the State's future progress rests.

CROP ADAPTATION

Many plans have been suggested for alleviating economic distress caused by excessive production of some agricultural commodities. Some of these approach the problems from the marketing standpoint. Others would attack them by means of an educational campaign with emphasis upon the readjustment of farm enterprises. Still others would organize producers for the purpose of purchasing and destroying submarginal orchards and vineyards.

Regardless of the manner in which the problems are to be approached, the question of selecting alternative crops or of utilizing the land for other purposes must be met by giving consideration to the physical and economic aspects of crop adaptation in California.

The date, pomegranate, fig, early table grapes, and grapefruit are particularly adapted to the desert regions of the southern part of the state where elevations are not too great and water supplies are obtainable. In this region winters are very mild and the summers are characterized by intense heat. In the lower foothill slopes and portions of the valley floors of the San Joaquin and Sacramento valleys where the winters are somewhat cooler, many of these same crops are produced, but the date is dropped from the list, while the navel orange, persimmon, olive, and almond are added. The interior valleys of southern California have less variation in temperature than either of the other two areas mentioned. Because of this and the fact that the total amount of heat is favorable to their production, the acreage of Valencia oranges has been greatly expanded here. The climatic advantage makes it possible for the oranges from this area to reach eastern markets at a time of year when competing areas are not shipping fruit. Other subtropical fruits and nuts also thrive in these valleys. The southern coastal region, having still less variation in temperature, is characterized by summer fogs, moderately cool summers, and mild winters. This region has an advantage over all other parts of the United States in the production of lemons and avocados. Most of the other subtropical fruits and nuts, including the Valencia orange, do well here.

From the standpoint of geographical distribution, areas producing citrus fruits, figs, olives, and grapes merge with and overlap these areas producing such deciduous-tree crops as pears, plums, prunes, and peaches. The central California coastal fog belt, however, specializes in the production of deciduous fruits. In portions of this belt, the production of fruit on a commercial scale is confined largely to apples. Pears, sweet cherries, and apricots thrive in the warmer portions. Further inland, the climate becomes noticeably warmer. In the valleys of the central and northern Coast Range apples are confined to the cooler parts, while pears and walnuts are grown on the richer soils

where the frost hazard is too great for most of the stone fruits. Probably the area of widest crop adaptation is the Sacramento and San Joaquin valleys. Here most of the deciduous fruits are found growing side by side with grapes and even citrus. The temperature in general is too high for the production of apples, which is confined either to the coastal areas already mentioned or the Sierra Nevada foothills. In these broad valleys there are variations in soils and climate which, together with economic factors, have produced a highly specialized form of agriculture. Pears are grown in the Sacramento Valley and the northern part of the San Joaquin Valley, but not extensively in the South. To the influence of wind movements through the Carquinez Straights upon the vineyards of the northern San Joaquin Valley is attributed the color of the Tokay grape grown in that section. The canning peach area in Sutter County and the raisin industry in Fresno County can be explained in terms of soil, water, climate, and initiative on the part of the inhabitants of these localities. These are important considerations when it comes to proposing alterations in land utilization as a means of relief from the agricultural depression. A similar discussion could be made concerning annual crops, but the problem of shifts in utilization with regard to these is not so serious.

California probably has a wider range of crop adaptation than any other state, but as a rule the alternatives of land utilization in any particular locality are limited. On the one hand there are the purely physical limitations, but the problem is more than a physical one. A crop may thrive abundantly under the particular local conditions but the investment per acre in land and improvements may be so high as to require a reappraisal of values before its production can show a profit. Any proposal to change the present status of land utilization must recognize the serious difficulty of selecting alternative uses for the land.

PLANNING THE USE OF LAND

In many states extensive programs have been launched in an attempt to bring about the abandonment of large areas of crop land unadapted to agriculture. In each of the regions where such programs are being carried out, conditions peculiar to the particular area have been the subject of investigation with the objective of planning the land utilization of the area. From the standpoint of improving local conditions such programs have great merit.

If the movement should become general, there might result some material reduction in certain lines of production, while other benefits would arise through the removal of many local difficulties. In most of the projects of this kind in the northern and eastern states, the problem has been to determine where agriculture should stop and

forestry begin. These endeavors have been particularly important where land has been settled beyond the margin of economic crop production.

In California many special considerations present themselves with respect to a program of this kind. On a large number of irrigated farms established in the foothills of the Sierras, the costs of irrigation development combined with the expense of land clearing and farm improvement have been greater than the value of the improved farm. These costs having been incurred, however, the question arises as to what the best procedure for these communities should be in the light of their present circumstances. There are also comparatively large areas of land in the foothills, the development of which will be encouraged at each rise in prices. Some of these areas, because of thermal conditions and good soil, will at some time prove profitable development projects, but the limitations of others are so great and the costs are so high that the ventures will result in financial failures, while the products from these ill-planned developments will tend to increase the amount of agricultural commodities being forced upon the market. It is highly important that such developments be discouraged and a more profitable utilization be determined. In some cases this may be forestry, in others grazing, while no use at all would be much better than the expansion of the crop area on land from which neither the individual farmer nor the community will receive a benefit.

Geographic classification of the gross area of the state in 1925 was approximately as follows:

	Millions of acres
Timber area	16.20
Brush fields	10.66
Woodland—	
Outside of farms	1.55
In farms not pastured	0.43
Woodland pastures in farms	4.22
Crop land in farms	8.40
Miscellaneous lands in farms	1.80
Unforested pasture—	
In farms	12.65
Not in farms	14.30
Urban area	1.24
Unclassified lands	3.19
Desert and sagebrush area	24.93
Water surface	1.69
Total area	101.26

Agriculture has made continual inroads upon land areas often better suited for other uses. The forest area has been reduced more than 30 per cent in the past sixty years and brush has been replacing trees on the mountain side. The utilization of the deforested land is a question of vital importance to the state—what areas might profitably be retained in brush for purposes of watershed protection, what areas might profitably be returned to forestry, and how much can and should be converted to grassland. Since California live stock consumes a

large amount of products from crop land, the improvement of the range is of importance to all farmers. It is vital that the various opportunities for a better utilization of California land be coordinated.

AGRICULTURAL CREDIT

The importance of credit as an economic factor influencing the welfare of an industry is not generally realized, but its importance as an element affecting production costs is often overemphasized. Liberal granting of agricultural credit during the first part of the past decade was an important factor in increasing production in California. Had not bankers and others been willing to make loans on the basis of high land values and high prices for agricultural commodities, the marked expansion of fruit and vegetable production, which now has resulted in such low prices for these commodities, would not have been possible.

Agricultural credit is used largely for increasing the amount of invested capital or for transferring the ownership of real estate. Investments in capital assets, such as land, buildings, fruit trees, or equipment, can not be readily liquidated because they are specialized as to use and location. Working capital or liquid assets form only a small part of the total capital used in agriculture. Curtailment of the supply of agricultural credit retards or stops expansion, but it is not as effective in reducing production as it tends to be in industries where credit is used for the purchase of raw materials, payment of wages, and sale of the finished goods. The farmer uses few purchased raw materials and furnishes most of the labor. He can not curtail operations and operate on a part-time basis.

AMOUNT OF AGRICULTURAL CREDIT USED IN CALIFORNIA

Farm Mortgages.—The United States Census reports only the mortgage debt against owner-operated farms, without considering tenant farms and those operated by managers. However, the total farm-

TABLE 5

Farm Mortgage Credit Used in California

Year	On owner-operated farms according to the census	Estimated total
1890	$46,767,837	$60,000,000
1910	60,036,660	100,000,000
1920	224,063,903	425,000,000
1925	295,688,806	450,000,000
1930	Not yet available	425,000,000

mortgage credit used by agriculture may be estimated by assuming the same relative number of these farms to be mortgaged, and at the same proportion of their value, as the owner-operated farms.

Census data for 1930 are not yet available, therefore the estimate for 1930 is based upon past figures, and interpretation of the economic changes during the past five years, and the available data regarding loans by different agencies. Many mortgages have been eliminated by foreclosures and others reduced when property was resold at a lower value.

The principal sources of mortgage credit in California, as shown in table 6, are the commercial and savings banks. The state and national banks have approximately $86,000,000 of loans each, while the Farm Loan System, which includes the Federal Land Bank and Joint Stock Land Banks, has only two-thirds this amount of loans, and insurance companies nearly a quarter as much, or approximately $20,000,000. These four types of institutions now have loans of approximately $250,000,000 on farm land within this state.

TABLE 6

FARM MORTGAGE LOANS IN CALIFORNIA MADE BY BANKS AND INSURANCE COMPANIES

Source of credit	Date	Amount of farm mortgage loans
State banks	July 1, 1930	$86,051,146
National banks	June 30, 1929	86,617,000
Federal land bank	June 30, 1930	28,643,582
Joint stock land banks	June 30, 1930	28,587,991
Insurance companies	December 31, 1929	19,995,998
Total		$249,895,716

Farm mortgage loan companies are not important sources of agricultural credit in California, but individuals and companies interested in purchase or sale of farms lend considerable sums to farmers. Recent surveys in the grape and apple industries in 1928 showed that individuals supplied between 30 and 35 per cent of the mortgage credit, and stores and other sources about one per cent. In all probability most of this credit is supplied in the form of deferred payments by farmers selling their lands, but in certain sections of the State, where economic conditions have been favorable, individuals have invested in first mortgages on farm real estate. This is particularly true in southern California and in other sections where the land has a high residential value. It is safe to assume that more than one-third of the mortgage credit of California comes from sources other than

banks and insurance companies. Assuming this proportion to be 40 per cent, the total farm mortgage debt of California in 1930 is about $425,000,000 as shown in table 5.

Short-Term Credit.—Most of the short-term credit for agriculture comes from the commercial banks. The United States Department of Agriculture has estimated that on December 31, 1920, the short-term credit supplied by banks to California farmers amounted to $119,000,000. This was between 25 and 30 per cent of the farm mortgage indebtedness in the state at that time. This was somewhat high, since 1920 was a year of depression and many short-term loans which ordinarily would have been paid before December 31 were carried over into the next year. The short-term credit being supplied by banks in 1930 is probably not much greater than it was in 1920. In 1927, it was found from the records of users of credit in the grape industry, that the short-term credit used at the peak of the growing season was 28 per cent of the farm mortgage credit and at the end of the year it was only 12 per cent. If the same proportion holds in other agricultural industries throughout the state, the total short-term credit obtained from banks at the peak of the season is practically the same as the figures given for December 31, 1920.

The commercial banks are not the only source of short-term credit. In the grape industry in 1927 about one-third of the short-term credit came from individuals, shippers, and others. The total short-term credit used at the peak of the season is therefore estimated at $175,000,000.

Bonded Indebtedness.—Another type of agricultural credit is that used for the construction of irrigation, reclamation, and drainage projects, and is obtained through the sale of bonds and warrants, which form a lien upon the land. This is not an individual but a joint obligation and as such is often overlooked by the individual in considering the indebtedness against his property.

Approximately two hundred million dollars is outstanding in bonds and warrants of irrigation, reclamation, flood control, and drainage and improvement districts, most of which have been issued since 1913. Reclamation and irrigation development has been very rapid since the beginning of the World War. Only five of the seventy-nine bond-issuing irrigation districts now in existence issued bonds prior to 1913. A total of $7,500,000 of bonds were outstanding on that date as compared with a total issue of approximately $98,100,000 outstanding at the present time. The area in these bonded irrigation districts in 1913 was only 538,000 acres, while today there are 2,985,000 acres in bonded districts, approximately six times the former figure.

Fewer data are available regarding the bonded debt of reclamation, levee, and drainage districts. In 1911, the State formed the Sacramento and San Joaquin Drainage District to supervise all flood-control construction and to include all lands of both valleys subject to overflow. Although many reclamation districts had previously been formed and much construction undertaken, it was not until 1911 that the State and Federal governments adopted a comprehensive plan of flood control for the Sacramento River. Since the Federal government is interested in the navigability of the stream, it agreed with the State to pay a definite part of the project construction cost. To take advantage of the State and Federal aid in carrying out this project, many new reclamation districts were organized in the Sacramento Valley. High prices received for farm products also stimulated reclamation district development, for many new districts were organized in the Delta area and in the San Joaquin Valley, although no State or Federal aid in construction was involved. Since 1911 the area in reclamation districts that have undertaken project construction has more than trebled.

Data indicate that there are approximately 175 active reclamation districts having a bonded and warrant debt of about $60,000,000. In addition, the bonded and warrant debt of the Sacramento and San Joaquin Drainage District is in round numbers $10,000,000. These figures do not include the many small drainage districts throughout the State, or the flood-control projects in southern California. Within the Sacramento and San Joaquin Drainage District, there are irrigation districts within reclamation districts and reclamation districts within drainage districts. In one locality there are four overlapping districts, all of which have liens against the same land.

In addition to the irrigation, drainage, levee, and reclamation districts, there are other forms of bonded districts, such as school districts, road improvement districts, and sanitary districts, whose bonds may be issued against the same lands. San Diego County, particularly, suffers from a multiplicity of overlapping districts. In the vicinity of Los Angeles, agricultural land is severely burdened by overlapping improvement districts to promote the sale of real estate subdivisions.

The total credit including these liens used by the agriculture of California is approximately $800,000,000, or about 25 per cent of the United States Census estimate of the value of all farm land and buildings in California in 1925.

COST OF CREDIT

Interest rates on farm mortgages in California have been declining for several decades. In 1890, the average rate of interest reported by the census was 7.2 per cent; in 1920 it was 6.6 per cent. The

Federal Farm Loan System has exerted a great influence in lowering the state average interest rate, especially since 1920. Eighty-six per cent of its loans have been made since that date and the weighted average rate of interest for all loans is 5.7 per cent. The rate of interest charged by the Federal Land Bank of Berkeley is today 5¼ per cent. The rate charged by Joint Stock Land Banks in California has always been 6 per cent. Since 1920 the commercial banks in most parts of the state have reduced their rates. Today the usual rate of interest charged by commercial banks for farm mortgage credit is 7 per cent, although in some of the remote sections of the state the rate is still 8 per cent. For various reasons banks have a few loans at higher and at lower rates of interest. Many loans made to farmers by individuals bear 6 and 6½ per cent interest.

Short-term credit costs vary more from one locality to another than farm mortgage costs and are usually a little higher, but they also have declined appreciably. In the Imperial Valley 8 to 10 per cent was the usual rate in 1920, while today 7 to 8 per cent is generally charged. In many places in the Sacramento and San Joaquin valleys, where the usual rate in 1920 was 8 per cent, it is now 7. In some of the highly developed agricultural regions bank rates are as low as 6 and 6½ per cent.

The effective rate of interest on credit obtained from stores, shippers, and finance corporations is much higher. When economic conditions are bad and banks unwilling to lend, individuals are forced to use more of this form of credit than when conditions are good. The use of this credit impairs bargaining ability and the user may get less service than the farmer who is not tied down by contract. Accurate figures on the cost of such credit are not available, but they are certainly much higher than the nominal rates charged. Some of the finance corporations dealing in cotton and live stock financing charge an effective rate of from 12 to 16 per cent interest and, in case of refinancing, the added commissions increase the rate still more. These rates of interest are not justified by the earnings of agriculture unless the farmer uses this high-priced credit for only a short period or only a small amount of credit for an extended period. These rates are high because of the number of poor-risk farmers financed, the small average amount of the loans, and the high cost of inspection and review.

AVAILABILITY OF CREDIT

Mortgage Credit.—Most farming regions obtain a large part of their credit from the cities through such institutions as the Federal Farm Loan System, insurance companies, and large savings banks. Local banks perform the important function of making contacts between local borrowers and these agencies.

Most of the areas in California experiencing difficulty in obtaining credit are in reality suffering from too free use of credit, of one form or another, in the past. Landowners in many bonded irrigation, reclamation, drainage, and flood control districts find it impossible to get credit to develop their land, without which they must pay for a service that can not be used. Since the district bond is a prior lien to the farm mortgage, it is hazardous to make mortgage loans in such districts as have not developed sufficient agriculture to assure financial success. Many areas have destroyed their mortgage credit by building projects too expensive for the developed area to carry. In other instances, though considerable development existed, more construction has been installed than was actually necessary, so that the bonded debt exceeds 50 per cent of the market value of the land. The nature of the State Reclamation Act is such as to encourage overconstruction, since it permits the building of a project before the final terms of financing are arranged.

Today the State government is seeking a way to improve the market for irrigation and reclamation securities. This market has been impaired less through changing economic conditions than through lack of foresight on the part of the State in permitting the building of projects without providing credit for the development of the agriculture to pay for them.

For the successful development of its resources, the State should give as much consideration to future credit facilities for the settler as to the engineering feasibility of the project construction. So long as irrigation and reclamation securities are approved as legal investments for trusts and savings funds, the State is obligated to the investing public to consider these more carefully before approving them.

Since the completion of the construction of most of these projects economic conditions have been such that many districts have defaulted in the payment of bond interest, and others hitherto considered in good financial condition are being regarded as doubtful by loaning agencies.

In many of the irrigation and reclamation districts of the state, the banks of the Federal Loan System never made loans because of excessive bonded debt or high operating costs or both. In some areas in which they formerly made loans it has been necessary for the banks to discontinue lending because these areas have since been changed into districts with excessive bonded debt, or because economic conditions have altered the prospective success of projects. When the irrigation and reclamation bond market was good, districts could refund their debt in place of retiring it, but this is now impossible, and many districts will be unable to meet the principal payments on

their debts as they become due. Possibility of financial collapse of these districts is affecting the farm mortgage credit situation. Although the Federal Land Banks have some loans in most of the irrigation districts, they are making new loans in only eighteen of the seventy-nine. These eighteen comprise 38.6 per cent of the total area in irrigation districts of the state and have a bonded debt of 41.0 per cent of the total. The bonded debt per acre of these preferred districts is a little above the average, but land values are also higher and agriculture more highly developed. Even a smaller number of bonded reclamation and drainage districts qualify for Federal Farm Loans. Probably no more than one-third of the area in all bonded districts can now obtain benefits of the Federal Farm Loan System.

The policy adopted by the Federal Land Banks, in most instances, influences other loaning agencies, to increase their rates, to limit their activity, or to withdraw from such territory.

In some of the areas where credit shortage exists the fault lies with physical rather than economic conditions. Lack of dependable and permanent water supply, drainage troubles, flood hazards, and receding water in ground-water pumping area are examples.

Had mortgage credit been more readily available in all districts after construction, more land would have been developed and the financial condition of the individual project would have been improved. However, this would have contributed to the general increase in production and an even faster decline in prices of agricultural products.

One form of credit difficulty has resulted from the farmers' determination not to reduce his standard of living and his indebtedness in proportion to the decline of his net income. In some cases farmers have attempted to maintain their standard of living by borrowing and naturally find themselves in financial difficulties, but even where the standard of living has been reduced, unless the indebtedness was also reduced so as to maintain the previous ratio between debt and farm value, this difficulty remains.

Short-Term Credit.—Income rather than security is the principal basis for short-term credit. If the loan involves more than current operations, security as well as prospective income must be considered. The banker must also consider the possible expense of liquidating the security. With a doubtful market the security has a much smaller value to the banker than to the borrowers. The banker can not feel confident of the soundness of his credit policies until he is confident of the future of the industry. "When in doubt, don't loan" is almost a proverb among bankers. The banker's first duty is to protect the interests of his depositors and stockholders, and second, to finance those who are already his borrowers. In times of financial stress obvi-

ously he will avoid the making of loans in doubtful industries. Farmers who do not make a practice of borrowing and believe they have ample security are often unable to obtain credit when they apply for it, because the resources of the banks are limited by the frozen condition of outstanding loans or have been used for financing regular borrowers, or because the banker has lost confidence in the industry.

The seriousness of the future credit situation will depend to a large extent upon the attitude of bankers. Most of the deciduous fruit industries have been suffering from excessive production, and conditions were aggravated in 1930 by a general depression throughout the nation. The tendency among bankers will therefore be toward ultraconservative credit policies. Unless bankers can be convinced of the stability of agriculture, credit will probably be difficult to obtain, so that many of those most worthy of credit may be greatly inconvenienced. Under such conditions, farmers will have to turn to other agencies than banks for their credit, and here the supply is limited and the costs are high.

Bonds.—The market for the sale of new or refunding issues of irrigation, reclamation, and drainage district bonds has been depressed by defaulting projects and by the economic changes affecting the value of all such securities. As soon as a district defaults payment of its bonds the market price falls much lower relatively than the capacity of the district to pay its debt justifies. Financial collapse affects land values, for no one can satisfactorily appraise the property until the debt has been adjusted. Corporations defaulting their obligations are forced into receivership, but defaulting districts are not compelled to meet with their creditors to readjust their financing, so that conditions unsatisfactory to bondholders and landowners are often allowed to drag along until the entire investment is jeopardized. The State should compel defaulting districts and their bondholders to make the necessary financial adjustments at once so as not to hinder the development of the project. The State could act as referee or appoint a disinterested party to supervise such adjustments.

SOURCES OF CREDIT

Commercial Banks.—In the past nine years (1921–29 inclusive) there were approximately 5000 bank failures in the United States, practically all in rural communities. California in this period had only 29 failures. In seven of the agricultural states, 40 per cent of the banks have failed since 1920. In the country as a whole failures among state-chartered banks greatly outnumbered those of national banks, while in California 16 national and only 13 state banks have failed during this period. This is evidence of the good quality of

banking in California, but these figures do not represent conditions correctly, for many banks that were bordering on insolvency have been taken over by branch banking systems. This has avoided bank failure, improved the condition of the stockholders, protected the funds of depositors, and assured banking service in the community.

Branch banking has expanded rapidly in California the last decade. There are now (1930) 430 banks in the state, 54 of which operate 853 branches. Twelve banks with head offices in San Francisco and Los Angeles operate approximately 90 per cent of these branches. Branch banking has become more prevalent in the large cities than in the other districts of the state. The banks and branches in San Francisco and Los Angeles total 442, of which 43 are unit banks and 12 are central banks operating 387 branches. Outside these cities there are 841 banks and branches, 333 of which are unit banks, 42 are central banks with branches, and 466 are branches. The unit banks in the two cities are less than 10 per cent of the total, but in the rest of the state they are approximately 40 per cent of the total.

The sentiment among farmers has been against branch banking. The reasons advanced were that credit was harder to get and personal contact was lacking. The independent bankers seemed glad to follow the conservative loaning policy of the branch banks and the farmers associated their resultant inconveniences with branch banking. Branch managers were often changed soon after purchase of the banks and the lack of personal knowledge of the community by new managers was resented. Many farmers contend that operating credit is principally personal credit and that a thorough knowledge of local conditions is essential to good banking. The rapid growth of branch banking has made it necessary to develop a large number of new managers, unfamiliar with the possibilities and limitations of branch banking. If the success of agricultural banking rests upon an intimate personal knowledge of local conditions and branch bank managers fail to recognize this fact, much competition from independent banks is sure to develop. Farmers making deposits, however, seek the safety of a large bank, while those needing credit often apply first at the independent bank. Personal acquaintance is often thought of as a means to easy credit.

Proponents of branch banking claim economies of operation with resultant lowering of interest rates, and this has certainly been true of Canada as compared with border states of this country. Large-scale and branch banking have several advantages, such as the possibility of employing better managerial talent, economies of operation, and possibility of safely transacting more business with smaller reserves where risks are distributed over a large area serving many different industries with peaks of credit demand at different seasons of the

year. Large banks usually have better credit-information facilities than small ones and are able to handle larger accounts and loans, which are more profitable than small ones.

Very little of the short-term credit business of the city banks is based upon personal credit. It consists mostly of loans on excellent security, which if not immediately marketable has at least a readily determinable value. Short-term farm credit on the other hand is largely unsecured personal credit. Production loans have no security until the crop is mature. Even if the loan is secured by rural real estate, its value depends upon the earning capacity of the operator, a matter not easily determined because of lack of farm records and audit information. If the banker is mistaken in his appraisal of the individual, losses may result. The quality of credit service rendered the community will depend upon the local manager. It will be difficult for rural branch banks to build up credit,information files for the local territory that can be passed on to the succeeding manager, and familiarity with local conditions is slowly acquired, though absolutely necessary. Further, if the new manager is familiar only with banking practices in the city he will have to orient himself to a new type of banking. If city methods are to be used in handling agricultural credit, many farmers will have to maintain a larger cash reserve and to make radical changes in their methods of financing. Probably the chief complaint of farmers against branch banking is the lack of personal contact.

Where adverse economic conditions have continued so that the real estate market has been destroyed by many foreclosures, some banks have permitted the farmers to remain on the land rather than foreclose property they could not operate as efficiently. Such policies have caused much ill feeling among those who have lost farms and uneasiness among those still on the land who fear unfair treatment when the market for real estate begins to recover. Some farmers have refused to remain under these conditions and have voluntarily deeded the property to the bank or simply abandoned it.

Federal Farm Loan System.—The principal criticisms of farmers against the Federal Land Bank are that the bank does not loan enough per acre, that farmers in need of credit can not qualify for loans, and that it takes too long to obtain a loan. The farmers also object to lack of privacy in their business affairs. Furthermore, other banks often hesitate to furnish secondary financing where a Federal Farm Loan is obtained. A highly conservative policy of banking has been necessary to enable the Federal Land Bank to survive the long depression period on the legally permitted spread of 1 per cent. A very small percentage of losses would wipe out this entire income. More and quicker banking service could be given and more risks taken in loaning, if a larger percentage of spread were allowed. One of the

principal objections to the Federal Farm Loan System is its inflexibility. This condition might be improved if the banks were permitted to increase their reserves by means of a larger spread, or if they were permitted to supply secondary credit in emergencies, thus eliminating the necessity for immediate foreclosure.

Failure of a few Joint Stock Land Banks in the Middle West and the poor condition of others has depressed the market for all Joint Stock bonds, and since these securities are selling far below par, it is more profitable to use principal payments from loans for the purpose of retiring the bonds than to make new loans. In general, Joint Stock Land Banks have found their business less profitable than they anticipated, and in the future few of these banks will be organized except as auxiliaries to other credit institutions.

Approximately 40 per cent of the total irrigated area in California is fruit and vineyard land, most of which has required more credit than could be obtained through the Farm Loan System. Federal Farm Loans are suited particularly to general farming, not to fruit and specialized crops of high value. The Federal Land Bank allows a maximum enhancement on fruit land of one-half of the "basic" value of the land if used for general farming. The maximum "basic" value of good farm land in California is usually about $300 an acre; hence, allowing $150 enhancement, a loan of $225 is close to the limit. This amount is too small to interest most owners of good orchards.

Under the present laws governing the operations of the Federal Land Banks the farm mortgage operations of the Federal Farm Loan System have probably passed the point of maximum usefulness to California agriculture. The prospect for increased activity among Joint Stock Land Banks is remote and the Federal Land Bank in California is already retiring more loans than are being made. In order to make these banks more serviceable to agriculture, it will be necessary to include in the Farm Loan Act provisions for making other types of loans than are now being made; for instance, a short-term amortization loan on orchard improvements. Such loans might be second mortgages bearing a rate of interest commensurate with the risk and of short enough term to conform with the outlook for the industry.

The usefulness of the Intermediate Credit Bank to agriculture can not be measured in terms of the volume of business transacted. It serves to assure credit to agricultural organizations when rates of commercial banks are high. The rate of interest charged by commercial banks for commodity loans to cooperatives is largely determined by the rate charged by the Intermediate Credit Bank. On July 1, 1930, the bank had outstanding in California $4,053,760 of commodity loans and $4,590,870 of discounts. In order not to duplicate the activities

of the commercial banks, the Intermediate Credit Act, until recently amended, prohibited the Intermediate Credit Bank from making commodity loans for a period of less than six months, although many associations need shorter-term loans. Cooperatives whose credit needs are not met by the Intermediate Credit Banks and commercial banks may now apply for supplemental loans to the Federal Farm Board.

Finance Corporations.—Finance-corporation activity in agriculture is a recent development. So far these corporations have operated mostly in the cotton and dairy industries. When properly operated, they can perform a valuable service to agriculture, but under present conditions they are not under State supervision and have an excellent chance to take advantage of the farmer. Their profits are not entirely confined to financing, since they are usually interested in the sale and often in the purchase of the product financed. Indirect gains and penalties often increase the cost of this kind of credit to a prohibitive figure.

Agricultural Credit Corporations.—Some of the credit for financing production in the cotton and dairy industries has come from the Federal Intermediate Credit Bank, but such loans are reviewed by the bank before the paper can be discounted and the rate charged is fixed by law. Only the best of this type of loan gets in the files of the Intermediate Credit Bank. This type of financing is not in itself attractive to private capital, except as an adjunct to the purchase or sale of a commodity. It would appear to offer a suitable field for cooperative marketing agencies, particularly in those industries now complaining of credit deficiencies.

Americans have shown themselves ready enough to cooperate to the extent of pooling their products for sale and have done some cooperative buying, but have shown great reluctance to assume any responsibility for their neighbors' financial affairs, as is required in cooperative credit. The Federal Land Bank is a cooperative institution, but many farmers did not realize that the liability they assumed would be enforced. The National Farm Loan Associations have sometimes failed to cooperate with the bank to establish the quality of the personal risks, and have even hindered the bank from arriving at the facts. Associations refused to reject loans, trusting to the Federal Land Bank to do this for them, since the applicants were their neighbors and personal friends. Sometimes good loans were prejudiced through jealousy of Association officers. If the members of the Association had been convinced that the liability they assumed would be enforced, a different policy would have been pursued. It has become necessary for some of the Federal Land Banks to enforce the double stock liability of associations, a policy which will greatly improve the quality

of supervision. If Agricultural Credit Corporations are established and the personal liability of borrowers is emphasized, the quality of loans granted will probably be satisfactory.

In one instance the Federal Farm Board offered to provide the capital for establishing an Agricultural Credit Corporation to be operated by a large cooperative marketing association. No definite announcement has been made of its policy in this matter, though interest in the formation of such organizations has been indicated. In this way farmers would have access to the general money market through the medium of the Federal Intermediate Credit Bank. The Farm Board would necessarily educate cooperative managers in banking to protect its own capital and all loans would be reviewed by the Intermediate Credit Bank. Between the two, the technique of sound banking in this field should be developed.

If agriculture is to receive the kind of banking it needs, it must develop its own credit institutions as it has done in other countries. In Germany nearly all production credit is obtained from cooperative credit associations. There, cooperative organizations may be engaged in selling, buying, or cooperative credit, or they may include departments for all of these activities. This reduces cost and eliminates duplication. Costs of inspection and review of security could be materially reduced through the regular routine of the field department of a cooperative, so that the management could take charge of the supervision without much extra office expense.

An attempt to foster cooperative credit associations was made a few years ago in South Carolina, but the units were too small to be very profitable or serviceable. These were not operated in connection with any marketing agency. Although several states, including California, have have enacted laws permitting the formation of such organizations, too few have been established to be of any importance.

Federal Farm Board.—The Agricultural Marketing Act of 1929 creating the Federal Farm Board has provided additional credit facilities for agriculture to supplement those already established. The Board may make loans to cooperatives for the purchase of capital equipment, which could not be made through the Federal Farm Loan System. The Intermediate Credit Bank may loan up to 65 per cent of the value of a commodity, and commercial banks usually limit their loans to about the same amount, but the Board if it so desires, may make a supplementary loan up to 90 per cent of the value of the commodity. Farmers are sometimes prevented from joining cooperative marketing associations because of the small payment made upon delivery of the crop, but cooperatives now may obtain funds from the Federal Farm Board to eliminate much of this difficulty.

Other Agencies.—As farmers exhaust their credit with local banks they are prone to turn for credit to buyers and shippers. In 1927, it was found that 35.8 per cent of all grape growers marketing through independent shippers obtained credit from their shippers, the amount varying from small loans for supplies to complete financing of production operations. In some localities the percentage of farmers financed in this way is even larger. When there was competition among marketing agencies because of crop shortage and high prices, shippers offered financing in order to secure volume, but when prices were low, the risks increased so that shippers found the practice unprofitable. In some localities financing has practically ceased; in others where the depression is less, financing by shippers is still one of the principal sources of credit. Though the nominal rate of interest for such credit is reasonable, the total cost is often high, considering the sale price of products and other items indirectly involved.

It should again be emphasized that shortage of credit is not one of the principal problems of California agriculture. The Federal Farm Loan System and the Federal Farm Board provide facilities adequate to supply most needs if farmers will establish institutions to take advantage of the facilities offered. This may take a long time, but unless the effort is made, it is difficult to see how farmers can criticize the credit agencies for their policies.

TAXATION

The farmers of California pay about $65,000,000 annually in direct property taxes to counties, and millions of dollars more in special assessments levied by the various kinds of districts throughout the state. Farm taxation in California at present differs from that of many other states in that no property taxes are collected for the support of the State government. The State derives its tax revenue from a gross receipts tax on public utilities, a franchise tax on corporations and banks, corporation organization fees, inheritance taxes, a gross premium tax on insurance companies, and other sources. In case of an emergency, however, the State may collect revenue from the property tax.

The State also collects a gasoline tax, one-third of which is allocated to the counties, and a motor-vehicle license tax and highway transportation gross receipts tax, one-half of which are allocated to the counties. The farmers pay gasoline and motor-vehicle license taxes directly. They also may pay inheritance taxes and in some cases Federal income taxes. Direct agricultural taxation in California, however, centers around the property taxes.

Some of the local, State, and Federal taxes paid by others are shifted in part to California farmers through higher prices for the things

farmers buy. State taxes such as those on gross earnings of railroads tend to be reflected in higher freight rates for all commodities, including agricultural products. Some Federal tariffs have an influence on the prices which all classes of people pay for what they buy. While some taxes may be shifted to farmers, taxes levied on farm land, especially during periods of heavy production or excessive competition among farmers, can not be shifted to other groups or classes because farmers can not not increase the prices of their products. At such times, taxes on farm land fall almost entirely on the landowner.

During the past decade, while farm incomes have declined, taxes have increased to the point where in many instances all of the income from the land is required to pay the tax bill. The continued increase in taxes has, no doubt, been one of the causes contributing to the decline in land values.

SOCIAL ASPECTS OF AGRICULTURAL TAXATION

A workable and reasonably equitable tax system is requisite to the proper financing of government and to the welfare of the people. Governmental needs, the peculiarities of the agricultural industry, and, in the last analysis, the attitude of the legislature and the balance of political power will all have an influence on the changes that may be made. There is no single or exact basis for prorating or apportioning taxes among individuals. Some taxes can best be assessed on the basis of benefits received, some on the basis of ability to pay, and others, indispensable as they are, can only be justified on the basis of administrative expediency. Most taxes at present are collected, regardless of ideals or theories of justice, from sources that will yield revenue.

The benefits from many taxes are diffused to such an extent that they can not be traced or measured. To illustrate, there is a general recognition of the wide diffusion of the benefits from highways, and the cost of their construction and maintenance is now paid largely by the county, State, and Federal governments; in earlier days the roads were owned by private individuals and companies or supported by the residents of limited areas. Education represents another activity in which the diffusion of benefits is recognized, and therefore the county and State governments are contributing an increasingly greater proportion to the support of local schools. The Federal government also contributes to some types of instruction.

It is usually conceded that the development and proper utilization of the state's resources are beneficial to the majority of the people. Yet in only one of the large flood control projects in California has the State government helped defray the cost of development. Although land ranks among the most important resources of the state, the cost of improving and developing it is still largely treated as a local matter

and the cost is borne by the local communities. In the two colonization and development projects planned by the State, some of the costs fell back on it and came out of general revenue. This was accidental, however, rather than anticipated State aid.

Unless it is recognized that under modern conditions many of the services of government are of general concern and unless the counties and the State are willing to assume a greater share of the cost of schools, roads, and general improvements, farmers as a class will have little chance of reducing their taxes without reducing the quantity or quality of the services bought by tax revenue. Some economies in administration might be brought about, but this could not have a very marked effect on tax rates.

PRESENT METHOD OF FINANCING

The average distribution of county expenses in California is: Education, 43 per cent; highways and bridges, 20 per cent; general government, 12 per cent; charities and corrections, 10 per cent; protection to persons and property, 7 per cent; and other miscellaneous items, 8 per cent. Contrary to public opinion, the supervisors have little discretion in determining the tax rate which they must levy. The tax rate reflects the public needs and demands. It is determined by express provision of law, by estimates and demands of governing boards and officials other than the supervisors, and in a few cases by the discretionary action of the local legislative body.

District funds for school purposes are supplemented by county and State appropriations. Because of high social standards and general concern in education, it may be desirable that a larger share of the cost of education be shifted to the State with a consequent widening of the tax base.

Funds for the acquisition, improvement, and maintenance of roads and bridges are derived from Federal, State, and local sources. Roads are no longer a matter of strictly local importance. Roads used solely by and for farmers are few indeed. Nevertheless the rural road tax still constitutes one of the major items in the tax rate levied on farm property. Other means of financing roads and highways should be substituted for this tax.

In addition to general county taxes, special assessments are levied against property, presumably in some rough measure on the basis of benefits received. These constitute an important part of the farmer's total taxes. Aside from special taxes for schools and roads, numerous other kinds of improvement and development districts may levy special taxes to be collected either through the county agencies, through special agencies established for administrating the project, or through private or finance agencies. In fact the decentralized method of

administering such projects makes it difficult for a prospective property owner to determine the total outstanding public debt against the property. Some of these special levies for large expensive projects constitute a considerable item of taxes, whether measured relative to income or value, or on a per-acre basis. Even minor levies may be very important when a farm happens to fall within the limits of a number of different taxing districts. A farmer may be forced into a district by vote of others regardless of whether or not his property has present earning power enough to meet all payments and leave enough for the living of the farm family. In some cases the development ultimately becomes beneficial to the property, but the farmer may be forced out of business before that time arrives.

The legal provisions for financing improvements by means of levying special assessments on the bases of benefits received are frequently abused. Outside interests often initiate and sponsor projects for their own gain. Property owners are often either uniformed or misinformed as to the ultimate cost of the proposed project and the benefits which they may reasonably expect to derive from it. Many of the improvement acts are at fault in providing that a protest of the property owners may be overruled by act of the governing board and in not allowing adequate time for protest. The law requires that a levy for special improvement upon land shall not exceed the value of the benefit to the land. This legal requirement has little practical effect because of the impossibility of determining the benefit to the property arising from the improvement. In many instances land really benefited is left out of the district, while land deriving little or no benefit is included. Improvements made as promotional schemes are sometimes disasterous to property owners. The present constitutional restrictions as to the bonded indebtedness of counties, municipalities, and districts are wholly inadequate to meet the situation. The State could improve this by providing some means of supervision or control to prevent special assessments from reaching a level so high that the property no longer has any value to its owner. The field of special taxes offers the greatest opportunity for relief to agriculture.

THE PROPERTY TAX IN CALIFORNIA

Since California's adoption of the present system of taxation in 1910, the property tax has been reserved, except in case of State emergency, as a source of tax revenue for the counties, districts, and municipalities. All tangible property is subject to the general tax rates of the jurisdictions in which it is located. Securities such as stocks, bonds, and notes are subject to a uniform two-mill tax and solvent credits to a one-mill tax levied by the respective counties and

divided among the counties, school districts, and municipalities in which the owner resides.

Both the constitution and the codes of laws in California stipulate clearly and definitely that property shall be annually assessed at its full value at the point of its situs as of midday the first Monday in March. Equality of assessment is, obviously, the intent of the law. Despite this mandate, however, in practice assessment of tangible property at full market value appears to be accidental rather than intentional. The assessment rate actually applied is discretionary with the assessor and varies widely from county to county and between properties.

The 1930 county tax rolls showed an assessed valuation of common (nonoperative) property aggregating $8,809,489,537. Of this amount $1,334,481,852 was stocks, bonds, and notes subject to the two-mill rate; $499,841,574 solvent credits subject to the one-mill rate; $962,-028,425 tangible personal property; $2,143,372,981 improvements and $4,867,173,026 the assessed value of the 52,158,506 acres recorded on the local tax rolls.

The Property Tax on Tangible Personal Property and Real Estate.—The property tax is commonly criticized as being essentially a tax on real estate. It is generally conceded that, as a rule, a larger percentage of real estate than of personal property comes within the observation of the assessor. Furthermore, two-thirds of the personal property placed on the assessment rolls in 1930 is intangible property subject to a tax rate of only one or two mills, while real estate and tangible personal property pay a much higher rate.

Detailed study of data obtained in two counties indicates that the amount of personal property appearing on the tax rolls depends in part upon the diligence of the assessor.

In one of the counties only two-thirds of the taxable tangible personal property, such as live stock, equipment, household furniture, stock in trade, etc., was assessed in 1929. One-third escaped assessment. The rate of assessment applied to personal property assessed was less than half of that applied to real estate. Therefore, while such property should have contributed about 13.6 per cent of the property taxes, it actually contributed about 4.5 per cent. These proportions varied considerably with different classes of property, such as farms, businesses, apartment houses, and private residences, but in all cases there was the same tendency to underassess personal property. In the other county from which data were obtained, the situation was different. A much smaller percentage of the owners of tangible personal property escaped the rolls of the assessor in 1929, and this class of property was subjected to an assessment rate higher than that applied to real estate, a heretofore unheard-of condition.

The Property Tax on Intangibles.—The difficulties of taxing intangibles have been known for a long time. The constitutional provision exempting certain kinds of intangibles from taxation and the statutory rates of two mills on stocks and bonds and one mill on solvent credits have greatly reduced the possible amount of revenue which might be raised from a tax on such property. Even though the rate is so low, only a very small proportion is assessed. In one of the counties studied less than one-half of one per cent of the taxable intangibles were assessed; in the other county this percentage was 16.

Variations in Assessment Between Similar Properties.—When assessed valuation is compared to owner's estimate of market value, there is considerable variation from farm to farm, residence to residence, and business to business. The ratio obtained from such a comparison ranged from over 300 per cent to less than 5 per cent.

The average rate of assessments of properties studied was approximately 30 per cent of the owners' estimate of market value in one of the counties and 19 per cent in the other. For only a small proportion of the properties in either county is the ratio of assessed value to market value reasonably close to the average, indicating that many properties were paying more than their share of property taxes, while others were paying less. This variation in assessments between properties appeared to be more pronounced between farms than between other real-estate properties and much more pronounced in one of the counties than in the other. However, the same type of variation appeared in the assessment of city property where city and county assessors both evaluate the same property. City and county assessors seldom arrive at the same valuation of identical properties, and no attempt is made to confer on the values of properties in which wide differences exist. The reasons for variation in rate of assessment are numerous. The most important without a doubt is the difficulty of obtaining a figure of fair market value. Sales of real estate are infrequent and actual sales data are difficult to secure. Moreover, they may be misleading because either the buyer or seller may drive a bargain. Real-estate values are not constant but change from year to year and within the year. These changes are difficult to recognize and measure and therefore properties rising in value tend to be underassessed, while properties falling in value tend to be overassessed. This type of variation was very pronounced in one county, where fruit land of steady or increasing value was assessed relatively low compared to general farming land, which has been falling in value. Variations may be caused by lack of knowledge on the part of the assessor and in some cases, no doubt, by favoritism or political influence.

Variations in Assessment Between Farm Real Estate and Other Classes of Real Estate.—The data obtained in the two counties indicated that there was no distinct tendency to over or underassess any particular kind of real estate. The differences were so slight that they might be entirely due to the number of cases studied and the representativeness of the cases, or they may be due to the trends of real-estate values. There is a tendency for changes in assessed values to lag behind changes in market values and therefore with declining farm real-estate values and stationary or rising city values, farm properties would, by the very nature of things, be found to be overassessed. If the counties studied are representative of the state as a whole, farm taxation cannot be materially improved by shifting any appreciable amount of taxes to other real estate under the system of property taxation.

City property is often taxed more than rural property because, in addition to the general county tax, it is subject to general city taxes as well as special assessments. These taxes, however, pay for services such as better schools, streets, lighting, sewers, and water, which are prerequisites to an acceptable standard of living in cities.

Variation in Assessment According to Size of Property.—The data obtained in the two counties show that there was a distinct tendency to overassess small properties. The same tendency has been found in other states where similar studies have been made and is apparently largely inherent in the problem of making assessments of different-sized properties. This tendency was more pronounced in the cities than in the farming areas.

Need for Equalization.—Farmers as a class or group are not appreciably handicapped by these variations in assessments between farms in the same county because their total taxes would be just the same if all farms were uniformly evaluated. However, the individual farmer, now overassessed, would gain from better assessments, while those now underassessed would be compelled to pay more taxes.

The creation of the various inter- and joint-county improvements and road districts is reviving the need for equalization of assessments from county to county. The size of the taxing unit varies from time to time and from project to project. The Golden Gate Bridge District is an illustration in point. Here a taxing unit consisting of six counties has been created. Fairness in the financing of this and similar projects will necessitate that all property therein be assessed uniformly. Equality in assessment will probably do more toward relieving the overassessed individual farmer and city real estate owner than any other single change which might reasonably be expected.

Relation of Taxes to Income.—A comparison of general county taxes with the rental income from the various classes of real estate in 1929

showed that in one county 11 per cent of the income from farm real estate was absorbed by these taxes, 10 per cent from apartment houses, 9 per cent from residences, 8 per cent from business property; in the other county, 11 per cent from farm real estate, 6 per cent from apartment houses, 10 per cent from residences, and 5½ per cent from business property. The percentage of farm rental income taken by general county taxes was largest because of low incomes of farm property.

NEED FOR TAX REFORM

The system of taxation cannot be constantly adjusted to changes in economic conditions. However, when it becomes too far out of line with economic conditions, changes become desirable and eventually necessary. The property tax is not now as well suited to economic conditions and administrative expediency as it was a generation ago. The growth of population and increased standard of living have necessitated greater and greater public expenditure. Since 1911, the total cost of government in California has increased 482 per cent. Measured on a per-capita basis, the total cost increased from $44 to $119 between 1911 and 1929. State costs increased from $6 to $20, county and district costs from $23 to $69, and city costs from $15 to $30. A part of this increased per-capita cost represents higher costs for the same goods and services due to changes in the price level, but the greater part of it is due to increased governmental activity in supplying more and better goods and services by the use of tax funds.

Although during this period population has doubled and the assessed valuation of property has trebled in California, the property taxes and state taxes have failed to keep pace with public expenditures. This has necessitated increased borrowing. The total bonded debt has increased 732 per cent. The State debt increased twenty times, the county debt twelve times, and city debt four and a half times. Deficiencies in revenue can not be continuously met by increasing the bonded debt. Sooner or later the time will come when further borrowing becomes impossible and government activities must be curtailed or new sources of revenue found. Property taxes on real estate now take such a large part of income from such property that the possibility of further expansion of revenue from this source is very limited.

During the last century there has been a very rapid increase in the proportion of the population that owns no taxable property, such as people who dwell in apartments or rented houses and live from income earned currently or obtained from investments. People who do not own taxable property enjoy the goods and services furnished by the government without contributing directly to the cost of them. There is little reason to believe that nonowners of taxable property pay more indirect taxes than do those who are directly subject to the

property tax. Farmers probably have a greater proportion of their wealth in real estate and tangible personal property than other classes of people. To the extent that this is true, farmers now pay an undue share of the total tax bill.

To relieve farmers of this undesirable condition requires some means of reaching the class of persons having tax-paying ability but owning little or no taxable property. Steps must also be taken to reach the tax-paying ability resulting from the ownership of property that is now escaping the assessment rolls.

A number of new sources of tax revenue are frequently proposed as means of supplementing the property tax. These proposals include a personal income tax, a business tax, a sales tax, a stock-transfer tax, and a severance tax upon timber, oil, and mineral products. Proposals have been made to relieve real estate of road taxes either by the expansion of the state highway system to include most of the county roads and arterial city streets, or by collecting a larger gasoline tax and increasing the amount allocated to the counties.

Several states have adopted personal income taxes as a step in solving problems of taxation similar to those discussed above. Where properly administered the personal income tax has proved a success. A personal income tax in California could be made to yield considerable revenue. If this sum were properly distributed among the local units of government or used by the State to aid local governmental functions, such as education, further increase in the tax on property might be avoided. Material relief could also be afforded the California farmer by extending the amount and distribution of the gasoline tax.

MARKETING

The expanding production of many of our agricultural products, declining prices, increased competition from other areas, and marked fluctuations in the purchasing power of consumers give rise to questions regarding the possibilities of improving the marketing system so as to increase returns to growers.

The difficulties and complexities of marketing have grown tremendously because of the rapid expansion of the production of perishable agricultural commodities in California for consumption in distant markets. The quantity of fruits and vegetables shipped out of the state by rail in 1928 and 1929 was more than double the quantity shipped out in 1921 and 1922. Increasing quantities are also being marketed locally to meet the needs of the rapidly growing population within the state.

With the increasing complexity of the marketing system have come a variety of problems. Many improvements have been made, but on the whole they have come more slowly than needs have grown. How-

ever, there is often an inclination to think that defects in the marketing system are responsible for conditions which are really due to excessive production or to high fixed charges, such as transportation, labor, and packages, over which marketing agencies have little control.

The wide spread in price between producer and consumer arises largely out of the degree of separation between them and the small-scale buying habits of the consumer. One of the results, however, is violent fluctuations in farm prices with relatively minor fluctuations in prices consumers pay. Thus, when California producers get $1.50 a box for pears on the tree, consumers in New York City may be paying $5.25 for the same quantity of pears. An increase in the supply sufficient to cause a fall in price of $1, or about 20 per cent, at the consumers' end would, because of high distribution costs and fixed charges, mean a fall to approximately 50 cents at the producers' end, or a fall of 67 per cent.

The more important marketing problems in California, together with some of the possibilities for improvement, are as follows:

Too Many Agencies.—In some localities there are so many agencies engaged in the marketing process that the volume of business of each is too small to permit of efficient operation. It would seem desirable that the number be reduced rather than increased. Likely means of accomplishing this may be suggested by what has already been done. In some cases the number has been reduced by the development of strong cooperative associations which have replaced groups of independent operators. In others there has been a merging of small units, either cooperative or private. In still other instances the same manager serves several associations, as is commonly the case in the citrus industry.

In some instances enthusiastic groups have established plants in excess of requirements or have erected more elaborate construction than necessary. This has meant losses to the particular growers involved and to others as well. The provisions of expensive facilities such as the proposed shipside cold-storage plant or of a cold-storage plant at a local shipping point should not be undertaken without careful consideration of needs and of alternatives.

Inadequate Facilities.—In various instances handling and storage facilities are obsolete, poorly located, or inadequate to meet the increased needs of today. The development of stronger and larger organizations with a sufficient volume of business to justify the development and installation of modern equipment is a step in the right direction. The large volume of business handled by the California Almond Growers Exchange and the California Walnut Growers Association has not only enabled these two associations to install the neces-

sary equipment for cracking imperfect nuts but also to invent and develop new and greatly improved equipment for this and other purposes.

Standardization of Grades and Packages.—During the past decade California has made excellent progress in the standardization of grades and packages. Further work is needed both in the development of additional or improved means of testing for the establishment of grades on specific lots and in the formulation of more adequate standardization laws. In some cases cooperatives themselves can go a long way in the establishment and maintenance of standard grades. Thus the California Walnut Growers Association with nearly 90 per cent of the California crop in its control has developed an elaborate system of standardizing the output of its 40-odd local houses.

Excessive Competition in Selling.—The keen competition arising out of a multiplicity of selling agencies and the hit-or-miss consignment of perishables often result in demoralization of markets. A bad price situation results when each of many shippers from a given locality telegraphs to a broker in a distant market offering at widely different prices goods which are supposedly similar. The establishment of clearing houses or the development of large cooperative associations is a means of overcoming this difficulty. In the Watsonville apple-producing region, where neither a large-scale cooperative marketing association nor the usual clearing house plan met with approval, the growers and packers have set up a cooperative sales agency.

In some cases coordinated selling plans need to be worked out. A typical situation is that of the Los Angeles egg market to which several associations both within and without the state are now shipping. A forward step would be the establishment in Los Angeles of a joint sales agency similar to Pacific Egg Producers Inc., which now sells eggs in large eastern cities for a group of Pacific Coast associations.

Need of Market Information.—There is often lack of information on market conditions and failure to interpret correctly such information as is available. California farmers already have excellent news service available by mail or radio on most of the important crops. There is need, however, for improvement in the service and for service on additional crops. The development of shipment by truck has raised new problems relative to the collection of information on supplies available both in the larger California markets and in the large eastern markets. The market news service should be expanded adequately to cover these shipments. Additional work is needed to develop methods of interpreting market news in terms of probable price, but in many cases improvement and elaboration of data on supplies, prices, and movements must precede this.

Development of New Outlets.—The rapid increase in production of California fruits and vegetables requires the development of all outlets that may offer promise. In some cases this may mean the development of new uses. Suggestive of possibilities is the development and sale by the California Fruit Growers Exchange of orange juice extractors, which have opened an enormous beverage market. Work now under way on the development of grape juice and other fruit products holds promise. The larger organizations are also expanding old markets by effective merchandising and advertising. In some cases industry advertising programs may be desirable, but these should be undertaken only when sales campaigns by closely coordinated sales organizations stand ready to take advantage of any increase in demand. Recent developments in the freezing of foods may lead to the opening of new outlets for certain California fruits. Apples are already being frozen for pie-factory use.

The foreign market for some products may be expanded. However, such development may be slow and expensive, since an appraisal of market conditions and consumer habits must precede even the planning of any sales-promotion campaign. The possibilities of expanding both the European and the Oriental markets for canned and dried fruits seem worthly of consideration. Unfortunately a retaliatory tariff is curtailing our outlets for fresh fruits in the Canadian market, which has been one of the best foreign outlets.

Surplus Control.—Excessive supplies at times depress market prices to ruinously low levels. Supplies may be excessive because plantings have been too heavy, because the weather in a given season may have been usually favorable or pests scarce, or because demand has fallen off. Under such circumstances surplus-control plans are socially desirable to prevent market demoralization. In at least seven instances, organized plans for the control of such surpluses are being operated in California. The California Fruit Growers Exchange has developed a plan for manufacturing surplus lemons into by-products. The Rice Growers Association of California, in cooperation with other agencies engaged in rice marketing and milling, has for several years operated a plan for the exportation of excessive supplies. In the case of the grape industry, an elaborate plan of surplus control backed by the Federal Farm Board has been put into operation. In the canning peach industry a carefully planned scheme for the same purpose was developed for 1930. The latter involved the cooperation of a group of canners and several cooperative associations. In Los Angeles the milk surplus is being handled by an association formed for the purpose by a group of dealers and producers. The Central California Berry Growers Association has been using a plan whereby surplus berries

are sent to canneries whenever prices would drop to ruinous levels if the entire supply were left on the market. The Imperial Valley lettuce and cantaloupe clearing houses have restricted shipments by higher grade requirements and by prorating of shipments among members.

The experience arising out of the operation of these plans should be used to point the way for sound developments in other industries as needs arise. Any such plans are expensive, however, and can not be viewed as substitutes for the adjustment of acreages to demand, either before or after such difficulties arise.

Regulation of Trading Practices.—There is frequent complaint among farmers of sharp practices among dealers who handle their products. This has been particularly true where the consignment method of selling perishables is used. Part of the trouble would be overcome if producers would not consign to unknown or questionable firms when they have the opportunity to deal with well-established, reliable firms. But from the producer's standpoint the difficulty can not be satisfactorily overcome without State or Federal regulation of commission agencies.

The Produce Dealers Act, also called the Commission Merchants Act, was passed by the 1927 legislature to regulate the intrastate commission business. In 1929 an additional law, the Deciduous Fruit Dealers Act, was passed to regulate certain types of interstate business in deciduous fruits, grapes, and dates. The latter act is at this writing before the State Supreme Court. In 1929 Congress passed the Perishable Agricultural Commodities Act. Regulation of these types has proved to be only partially effective because of the difficulty of obtaining pertinent facts and because growers are often loath to make complaint. It would seem, however, that the regulation established for the enforcement of these acts should go a long way toward the elimination of the more serious types of fraud in the produce business.

Other difficulties arise out of the efforts of buyers to put their offers in attractive form. In doing so they devise such a variety of contracts that farmers find difficulty in comparing offers. Many different methods have been used which disguise the actual price received by the producers. Such devices include dockage, undergrading, granting special services, and underweighing. The development of standard contracts acceptable alike to producers and dealers is worthy of consideration.

Cooperative Marketing.—Many of the improvements in the marketing of agricultural products have been attained through cooperative effort. The successful organizations have been especially effec-

tive in the development of new outlets, increasing the demand in old outlets, increased standardization, improvements in systems of distribution and handling, and in the correction of unsatisfactory marketing practices.

At the present time there are about 550 local cooperative associations in California and about 25 large-scale associations, some of which are federations of local associations above counted. The gross sales of these organizations during 1929 amounted to approximately 240 million dollars. Judging by the experience of the successful organizations, there is opportunity for cooperative endeavor in a number of additional fields.

There is, however, a real need for a clear understanding of the possibilities and limitations of cooperative marketing. The accomplishments of organizations operating along sound lines are generally recognized. The limitations are often overlooked. Most men today admit that a cooperative association can not arbitrarily fix prices; yet many denounce an organization which does not sell increasing supplies at continuously satisfactory prices—a thing which no organization, private or cooperative, can continue to do indefinitely. It must always be remembered that the volume of the product to be marketed must be adjusted to consumer demand if satisfactory prices are to be realized.

Producers, in numerous instances, have expected too much of cooperative associations in the way of surplus control. It should be pointed out that surplus control, as commonly conceived, involves the taking of a substantial loss on those portions of the product which are considered as surplus in order that the remainder may be marketed at satisfactory prices. In a cooperative association embracing less than all of the producers such procedure necessarily involves a situation in which those producers who are outside the organization obtain higher prices than those inside. Even with all the producers in one organization, outside competing regions are likely to be brought into the market as soon as prices become particularly attractive. Experience thus far indicates that no organization may expect to survive in which outsiders, for any length of time, obtain substantially higher prices than members. Compulsory cooperation is repulsive to most Americans, and probably is not possible under American law; yet some of the results which growers have expected of cooperatives could be obtained only under conditions in which every one was required to market in that way.

Where organizations have been particularly efficient they have naturally come to have substantial control of the commodity and will probably continue in that position so long as they continue to function efficiently. Outstanding examples of this sort are to be found in the

California Fruit Growers Exchange, the California Walnut Growers Association, and the California Almond Growers Exchange.

Cooperative associations can seldom carry their products clear through to the consumer, or even to the retailer. Organizations which operate mainly within restricted regions are in some cases successfully selling to the retailer. Such are the Challenge Cream and Butter Association and the Poultry Producers of Central California. Such organization as the California Fruit Exchange and the California Fruit Growers Exchange, which handle products of national distribution, find that they would require an elaborate and expensive organization to go to the retailer. Therefore, they merely place their product in the wholesale and jobbing markets as efficiently as possible, with, however, some dealers' service activities designed to move the products more expeditiously through retail channels.

It is particularly desirable in cases where organizations are not able to go clear through to the retailer that close and harmonious relations be established with the private trade. The larger organizations have therefore made every effort to maintain harmonious relations with wholesalers and jobbers.

Many cooperative associations in California are developing an important and growing business in supplying members with various types of farming requirements. Cooperative associations by buying in large quantities can frequently obtain for their members substantial reductions in price. They can also insure that goods bought are of a high and uniform quality, an important consideration where individual farmers have no means of testing the quality of such goods. During the year 1929 the Fruit Growers Supply Company, affiliated with the California Fruit Growers Exchange, sold containers, spray materials, fertilizers, and implements to members to the value of over $12,000,000. Three poultry associations had a turnover in feed and poultry supplies of over $8,000,000. From data available it would appear that the combined value of farm supplies sold to members by cooperative associations in California during 1929 was substantially in excess of $24,000,000.

The necessity for the development of machinery for membership contact in cooperative associations is becoming more and more apparent. In order to sustain membership loyalty and interest all associations have to devise means for keeping members acquainted with the policies and affairs of their association and with economic conditions surrounding the production and marketing of their product. The failure of many associations in the past is partly to be ascribed to the fact that members have lost interest in their association or have imperfectly understood what it was doing for them.

The passage by Congress in 1929 of the Agricultural Marketing Act definitely established a federal policy of assistance to cooperative associations. Such assistance may be of an educational or advisory nature. It may also take the form of lending money for various purposes. During the past year, the Federal Farm Board has made surveys covering the marketing of several California products and has made commodity and facility loans to a few cooperative associations. It has also fostered the Grape Control Plan.

INDIVIDUAL ADJUSTMENTS BY FARMERS

The discussion in the foregoing pages has shown that the welfare of the operators of farms in California is determined in a large measure by conditions or circumstances which the farmer, as an individual, can not change. In planning and conducting his operations, the farmer must adapt himself, as best be can, to these conditions and circumstances. Some of the conditions are determined entirely by nature and are therefore beyond human control, while others are due to national and international circumstances so far removed from the individual farmer that even the state can exercise little or no influence over them. However, there are many conditions that are directly the result of past action by the people of the State of California. Individuals or groups of individuals have in many cases engaged in activities relating to agriculture without sufficient knowledge of the situation or foresight as to the results of their activities. Often guidance or control by the State has not been exercised on account of lack of information, difference in points of view, or conflicting interests of different groups.

Often, the conditions over which the individual farmer has no control have produced adverse results, but sometimes they have contributed to the advantage of the individual farmer. For instance, the farmer whose peach crop in 1929 escaped frost made an exceptional income in that year. Many California farms have sold for more as residential sites than their owners could have expected to acquire by farming. Those who began to produce specialty crops before competition became excessive made high incomes. Even now the producers of some crops are in a favorable position.

CONDITIONS TO WHICH FARMERS MUST MAKE ADJUSTMENT

Even though the individual has only a very small degree of control over many of the factors affecting his welfare, it is highly desirable that he understand the situation and act wisely because, in the long run, it is the action of individuals in making adjustments or casting votes that will bring about improvements.

The vast resources of California which made the great development and expansion in agricultural production possible were favorable to the introduction and spread of numerous insect pests and plant and animal diseases. Many of these pests and diseases were introduced before the importance of control was recognized by the State. Even now there is not sufficient knowledge about many of the biological problems to determine how far the State should go in the best interests of society in attempting to control and eradicate pests.

Although the individual farmer has some control over the production on his own farm, his returns are largely governed by the total volume of the products to be marketed and the market demand. Many circumstances in California have contributed toward increasing the total volume of production. The physical conditions necessary for expansion were provided by nature and promotion by private interests aided by favorable laws and lack of control by the State brought about conditions of an excessive volume of production, low prices, and in many cases high costs.

The long-time interest of the farmer was subordinated to the immediate interest of promoters and the desire of merchants and manufacturers and transportation agencies for a large population in the state and a plentiful and cheap supply of food. Control of promotion and expansion is the most important phase of avoiding agricultural surpluses. An individual farmer can do practically nothing along this line, but effective cooperation between all agencies interested in the welfare of California agriculture and full recognition of the important rôle played by the State will help to prevent the recurrence of conditions such as now exist in the peach, grape, and rice industries.

Agencies both within and without the state have cooperated with farmers in increasing individual farm efficiency. The rapid adoption of improved methods and practices has had an influence on the volume of production. However, increased efficiency is desirable from the point of view of both the individual farmer and society. In the long run, California must compete with other areas in the United States and in the rest of the world. Improvement of the present situation and prevention of future trouble lies not in reducing individual or group efficiency but by discouraging or preventing farming in places and under conditions where returns will not cover costs or provide satisfactory incomes.

The individual farmer finds that many of his costs are determined by conditions over which he has no control. Interest rates are the result of numerous national and international relationships. The bonded debt and taxes to be paid have been or are largely determined by group action or laws which do not change with economic condi-

tions. Even where a farmer owns and controls his own pumping irrigation works, he can not prevent other farmers from starting similar enterprises and thereby lowering the ground water level until pumping costs become prohibitive and agriculture by all in the area impossible.

The farmer who operates his farm without hired labor must compete with farmers producing similar products with hired labor. Low-priced farm labor, therefore, benefits some farm operators but affects others in an adverse manner. The farm-labor problem in California involves national and international relationship, and it has many social aspects affecting urban communities.

The prices a farmer has to pay for the commodities and services he buys, like the prices of the products he sells, are largely determined by conditions over which he has little or no control. Tariffs may have an important bearing on his individual welfare, either by increasing the prices received or increasing his costs of farm operations or family living.

OPPORTUNITIES FOR ADJUSTMENTS

Despite the fact that many of the economic conditions affecting agriculture are not determined by the farmer and can be modified only by concerted action or legislative procedure, a farmer can often improve his income through better organization and administration of his business.

Most of the farmers of California have appreciated the possibilities of improving their position by producing the crops and live stock best adapted to their conditions and by adopting improved cultural and farm-management practices. A history of the agricultural development of the state would record remarkable progress along these lines. New and better strains of seeds and plants have been tried, developed, and adopted. Breeds of live stock have been improved, and methods of combating and controlling many diseases and pests have been evolved.

During recent years farmers have given more and more attention to increasing the efficiency and reducing the cost of their operations. Many farmers are keeping detailed records of costs and incomes with the aim of eliminating uneconomical or expensive methods of operation. An example of recent improvements resulting from the efforts of farmers to increase the efficiency of their operations is found in the rather general adoption of methods and practices of orchard cultivation which reduce costs without reducing yields. Another example is the widespread adoption by poultry producers of the practice of careful culling of their flocks with a resulting marked reduction in the cost of producing eggs.

Adjusting Production to Changing Economic Conditions.—Excessive production and declining prices of many commodities in recent years have served to focus the attention of many producers on the possibility of increasing their incomes by planning their production in the light of the outlook for the commodities they produce and by keeping the organization and operation of their farms adjusted to changing market conditions. Economic conditions are continually changing and one who expects to obtain a satisfactory income year after year must make every effort to keep his operations adjusted. This requires a knowledge not only of what changes are occurring and what the trend in the prices of products is likely to be, but also how these trends are likely to affect the farm business and what results are to be expected from any changes the farmer may make. More and more information from all parts of the United States and foreign countries bearing on the outlook for California products is becoming available, and many producers would benefit by studying this information more carefully when making their plans.

A farmer must always consider the natural conditions on his farm—the soil, climate, and topography—as well as economic conditions affecting the price of his products, when deciding what lines of production to follow. If he has an irrigated farm, he must also give careful consideration to the availability and cost of irrigation water. A stockman in the mountainous portion of the state, with little or no land level enough for economical crop production, would obviously be limited to the production of cattle or sheep; but at a time when the outlook for beef prices is relatively better than the outlook for prices of lambs and wool, it may be feasible for him to increase the number of his cattle and decrease the number of his sheep. Similarly a dry-land farmer is likely to find his alternatives limited to wheat, oats, or barley, no matter how unfavorable the outlook for their production or how favorable the outlook for the production of other crops. On the other hand, a farmer who is growing annual crops on irrigated land may have a choice of many enterprises. For example, many farmers on irrigated land along the coast may in any year produce lettuce, cauliflower, sugar beets, or any of a number of other annual crops.

Such farmers have the opportunity to adjust their operations quickly to take advantage of changed economic conditions. On the other hand, a farmer with a large acreage of bearing trees or vines finds it particularly difficult to quickly and economically readjust the number and size of the chief enterprises in response to outlook expectations.

The large and relatively permanent investment in mature irrigated orchards or vineyards makes it exceedingly costly to shift from fruits to vegetables or alfalfa or from one fruit to another, except where grafting is feasible. The rapid increase in juice-grape production in

the state in recent years is partly due to grafting, which could be more cheaply and rapidly done than is possible with tree fruits and nuts. Topgrafting of clingstone peach trees to freestones might prove a profitable change for some growers if not done too extensively throughout the state.

In considering a shift from one fruit to another, California growers are also faced by the difficult question of choosing fruits adapted to their locality and for which the price level five or ten years hence will probably be satisfactory. With considerable competition between fruits and with the outlook for depressed prices for many of them for several years, many fruit growers have no feasible alternative in fruit to which to turn. Even in cases in which a shift from one fruit to another appears desirable from the long-time point of view, lack of finances may prevent its consummation. The initial cost of uprooting and replanting an orchard, together with the ensuing period of several years of cultural expenses with but little income, prevents the consideration of such a shift by many growers. The shift from walnut to orange groves recently taking place in Orange County and that from walnuts to lemons in Santa Barbara County, require larger sums in cash and credit than are available to most fruit growers of the state. On many farms it is impossible to obtain the additional water that would be required for a shift from fruit to alfalfa or annual crops.

Considering all the difficulties involved in enterprise shifts by fruit growers, it seems unlikely that individual growers by voluntary readjustments of acreage will decrease the production of overexpanded fruits enough during the next few years to raise prices to a reasonably satisfactory level. Well adapted as much of our irrigated land is to fruit production, at a time of such unfavorable price outlook for most of our important fruits it is indeed unfortunate that such a large area is planted to tree fruits, nuts, and vines, and that many fruit growers are almost entirely dependent upon a single kind of fruit for their income.

Adjustments in Combinations of Enterprises.—The number and character of the lines of production to be included in the farm business is a point to which many farmers might well give careful study. For example, in one of the better districts in the north-central part of the San Joaquin Valley, a recent study to determine the results to be expected from different combinations of enterprises showed that under present conditions the operator of a 40-acre farm producing crops well suited to the soil and climate of the area and using efficient methods in all of his operations, could not expect to obtain a net income of more than $2200 a year from the combination of enterprises now found on some of the farms of the area, while from other combinations he might obtain a net income more than double this amount.

The trend in commercial agriculture towards fewer enterprises on each farm has probably been more pronounced in California than in any other state. Topography, climate, and soil naturally restrict diversification in many parts of the State. Most California farmers, therefore, very wisely are specializing in the few products which their particular region is naturally best adapted to produce at a low unit cost of output. The application of science and technical skill to production within the state has also favored specialization in a few, rather than in many products. Increased use of machinery and tractors likewise favors specialization, for farmers can not afford equipment for small areas of many different crops. Some diversification may be desirable in a small way to provide a better and less expensive food supply for the farm family, but commercial production, the dominant type of California agriculture requires specialization and concentration.

The operator with a small business who expects to handle his operations largely with his own or his family's labor has a somewhat different problem from the operator who depends primarily on hired help. Only under exceptionally favorable conditions can a farmer who does most of the work on the farm himself expect to obtain as high a net income from a single enterprise which requires only a small portion of his time, as he could obtain if he included in his business a combination of enterprises which would provide profitable labor on a full-time basis. As an example, the study of incomes to be expected in the area mentioned above showed that the operator of a 10-acre deciduous fruit farm can seldom realize a net income of as much as $2,000 a year without including in his business a line of production such as poultry, which will afford employment throughout the year. Most of the farmers of the area consider that a net income of at least $2,000 a year is necessary to maintain a satisfactory standard of living.

Low Cost and Efficient Methods of Production.—Even though many farmers have been giving increasing attention to improving the efficiency and reducing the costs of their operations, the present financial difficulties of some farmers are directly traceable to inefficient methods and high production costs. Production costs of an enterprise carried on under identical soil, water, and climatic conditions vary greatly.

For example, a group of sixteen orange growers in Orange County, each of whom obtained a yield of 275 boxes an acre in 1929, had production costs ranging from $1.22 to $2.06 a box. Seventeen dairy records for 1928 from Sonoma and Tulare counties from herds each of which produced 330 pounds of butterfat per cow showed variation from 27 cents to 76 cents a pound in the net cost of producing butterfat.

A farmer can keep his production costs at a minimum, only through constant and careful study of his operations. For this an accurate record of each enterprise on the farm is necessary. In addition records of costs and returns on other farms producing the same commodities are needed to afford standards of comparison. This requires cooperation among several farmers producing the commodity or operating farms of the same type. Most farmers are not equipped to analyze and interpret the records of their business and to make comparison with records from other farms. In such cases, the best results can be obtained only if a group of farmers cooperate with an agency supported by themselves or by public funds.

Knowledge that can be gained from comparative records can be helpful to a farmer in many ways. It will enable him to (1) plan ways and means of increasing his efficiency and lowering his costs, (2) determine the desirability of eliminating or enlarging an enterprise or of introducing a new enterprise, (3) prepare a budget of future operations, (4) determine the capital requirements of his business, (5) prepare a satisfactory statement for soliciting loans, (6) obtain data for tax statements.

Size of Farm Business.—Enterprise efficiency studies show that many farmers are producing at costs per unit substantially lower than selling prices. However, many farms are so small that even with the most careful selection of enterprises and the most efficient methods of production, the gross income will hardly be sufficient to pay operating expenses, care for other financial obligations, and provide a satisfactory standard of living for the farm family. Take for example the case of a poultry farmer who keeps an average of 800 hens throughout the year; by following good management practices he may reasonably expect to make a farm income of $1.20 a hen annually over a period of years. That is, the total returns for his labor and use of capital would amount to $960 a year. While the income per hen in this illustration is satisfactory, it is evident that the total income is not sufficient to maintain a satisfactory standard of living.

Consider a further example of a 10-acre peach orchard, which under good cultural practices would yield 10 tons per acre of merchantable fruit. With peaches selling at $25 a ton and the operator performing all labor except thinning, propping, and harvesting, the income, after paying operating expenses, would be about $125 an acre or a total of $1,250 a year. Unless the farmer had other sources of income, living expenses and interest on any indebtedness would have to be paid from this sum each year in addition to providing for upkeep of improvements, replacement of equipment as it wears out, replacement of the orchard at the end of its bearing life, and the retirement of debts as they come due. It is apparent that under present conditions, a busi-

ness such as this is too small to enable its owner to make financial progress, and still maintain an American standard of living for his family.

A farmer who is faced with the problem of too small a farm business has the alternatives of farming more intensively, buying more land, leasing additional land, selling out and renting or buying a larger unit, supplementing the farm income with other activities, improving the standard of living from the same income, reducing the standard of living, or leaving the farm and engaging in another occupation.

More intensive production involves changing the crop area to other enterprises which will produce a greater farm income per acre. It may mean the addition of a supplemental enterprise such as dairying or poultry, as suggested in the case of the 10-acre deciduous fruit farm in the San Joaquin Valley. The live stock farmer may be faced with the necessity of increasing the size of the poultry flock, the dairy herd, or other live stock enterprise. Such changes require additional capital and managerial skill. Additional capital will be required if size of business is to be increased by buying or leasing additional land. Under present-day conditions, however, the leasing of lands, particularly for the operator already established in the community, may be accomplished with limited amounts of capital. It is to be expected that some operators will have to sell their present holdings and resort to tenanting on larger tracts. Some may engage in other occupations and let those who remain farm the land in larger units.

Many farm families have opportunities for improving their living conditions by making better use of their time and the income available. Home accounts help to answer the questions: How much money was spent? How was it distributed? How can it be budgeted more adequately? Curtailment of living expenses and time spent in leisure and the enjoyment of life may be necessary during a period when net income is temporarily low. But only as a last resort, after considering all alternatives, including the possibility of leaving the farm and engaging in another occupation, is a farmer justified in accepting a permanently lower standard of living for his family.

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